# CCS 400

## Service manual
## System Description

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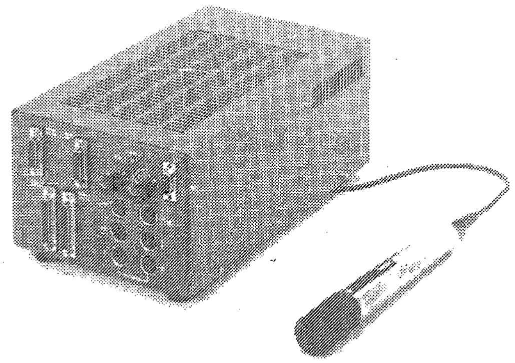

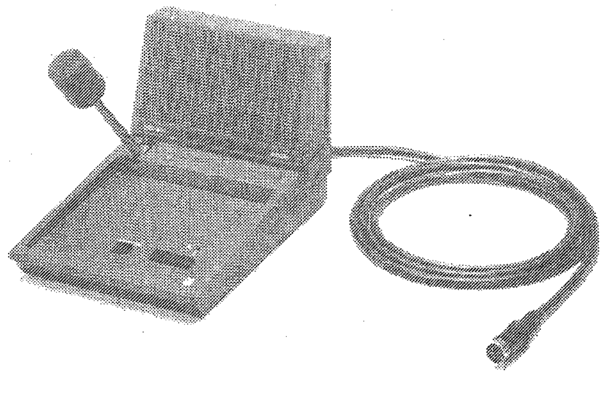

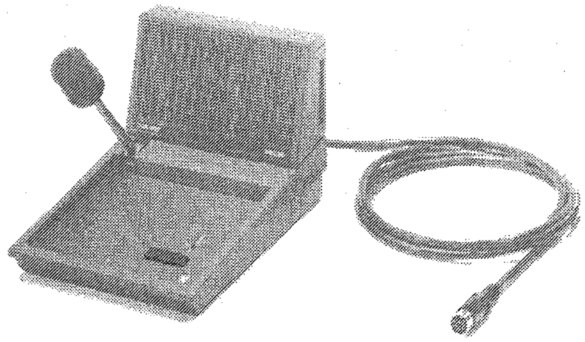

**Industrial &
Electro-acoustic Systems**

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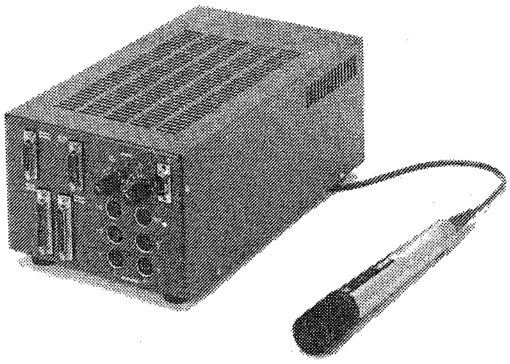
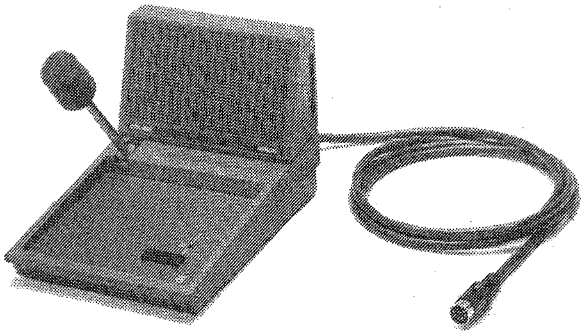
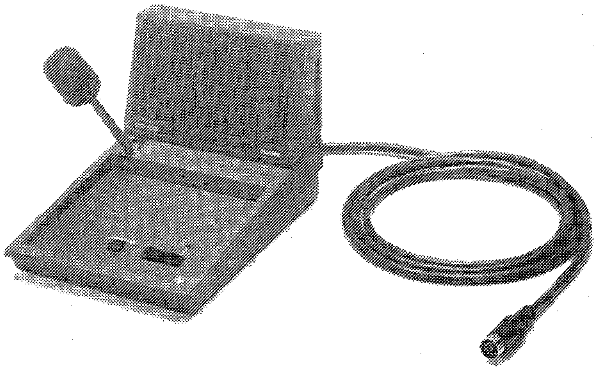
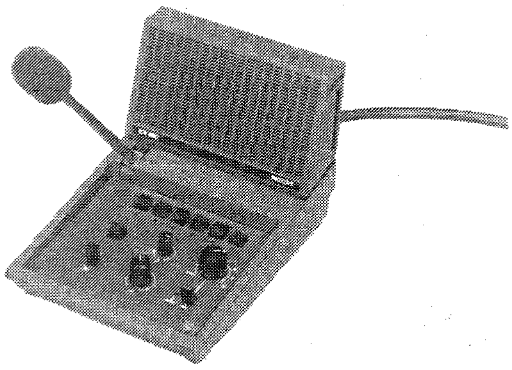
# CCS 400 Discussion, Conference, and Interpretation system.









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## 1. INTRODUCTION

Central Supply Unit/Interface (C.S.U.) LBB 3300/NN

1. The CSU controls the maximum number of simultaneously switched "on" microphones.
2. The CSU provides
   - volume control of the whole system
   - the priority attention signal
   - 3 db attenuation of the Audio signal when two or more microphones are switched on.
3. The CSU provides the supply voltage for the delegate units and chairman unit.
4. Two chains of maximum 35 units can be connected.
5. Maximum 18 6ch. interpreters desks can be connected to the system.
6. Distribution to channel selectors can be provided, when a Monitor Distribution Board (MDB) is inserted. Simultaneous distribution via a transmitter is possible.
7. A telephone coupler-, tape recorder-, and line in/line out connector is available.
8. By equipping the central supply unit with a plug-in unit (LBB 3302/00), a hand microphone can be connected.

| | |
|---|---|
| LBB 3300/.. | Central Supply Unit (CSU)<br>. Completely pre-wired unit with a basis PcB, a contribution panel, and power transformer.<br>. Two internal connectors are available to connect a roving microphone plug-in unit, and an interpreter monitor panel + Monitor Distribution Board.<br>. Mains switch on the rear side.<br>. Connection for delegate´s, Tel. coupler, recorder, line-in/out, and if applicable a handmicrophone, are all to be found on the front side of the unit.<br>. When the interpreter/monitor panel is added to the system, connections for distribution, monitoring, transmitter and interpreters units, are also located on the front of the unit. |
| LBB 3302/00 | Handmicrophone plug-in unit + handmicrophone<br>. Can be connected internally into the central supply unit via the contribution panel to the basic PCB.<br>. Interfaces the handmicrophone to the central supply unit, therefore acting like a normal delegate´s unit. |
| LBB 3301/00 | Interpreter + Monitor distribution panel<br>. Can be connected internally into the central supply unit via the contribution panel to the basic PCB.<br>. Interfaces the 6ch. interpreters desks to the system and if applicable to Monitor Distribution Board.<br>. The panel also provides three extra external connectors, for a monitor unit, a transmitter and distribution. |
| LBB 3203/00 | Monitor Distribution Board (MDB)<br>. Connected internally to the 3301/00.<br>. Provide, ch1/ch6 and floor to be monitored by the program selectors. (distribution)<br>. A selected channel is amplified together with the comm. signal and routed via 3301/00 to the monitor connector. |
| LBB 3350/00 | Table Top Delegate Unit<br>. Built in loudspeaker and microphone.<br>. Microphone on/off button, pilot lamp, microphone "ON" indication lamp and microphone request lamp.<br>. The mic. on/off button only becomes a request button, when use is made of a central control desk.<br>. Jack for headphone connection.<br>. Automatic delayed mic. switching off circuit. |

| | |
|---|---|
| LBB 3450/00 | Table Top Delegate Unit<br>. Identical to 3350/00, but without built in loudspeaker. |
| LBB 3351/00 | Table Top Chairmans Unit<br>. Built in loudspeaker and microphone.<br>. Microphone on/off button, pilot lamp and microphone "ON" indication lamp.<br>. Priority microphone function.<br>. Jack for headphone connection. |
| LBB 3451/00 | Table Top Chairmans Unit<br>Identical to 3351/00, but without built in loudspeaker. |
| LBB 3305/00 | Delegate´s extension cable<br>. Extends the connection between two delegate units, and/or between delegate´s unit and chairmans unit. |
| LBB 3221/00 | 6ch. interpreters desk<br>. Microphone signal amplifier, with AVC.<br>. Monitor section for headphone or loudspeaker.<br>. Switching circuit to allow the microphone- or floor signal to be switched to one of the chosen channels.<br>. Microphone mute switch. |
| LBB 3186/40<br>LBB 3186/70 | Central control desk<br>. Central control of 40 respectively 70 delegate units. |

## 2. BRIEF DESCRIPTION OF CSU AND PERIPHERALS

(see fig. 2 and 3.)

### Discussion

Pressing the microphone button S1 on the delegate unit, the microphone signal is switched via a pre-amplifier to the audio line. The switching function is provided by the switching control circuit (SCC). The loudspeaker is automatically switched "OFF", and the microphone "ON" LED indication plus the pilot LED´s are switched "ON". After pressing the microphone button again, the microphone signal will be cut of the audio line.
The audio signal on the audio line has now been amplified by its associated audio amplifier, and applied to the loudspeaker. The SCC also switches the microphone LED and the pilot LED "OFF". The disable request line, from the central supply unit ensures that the maximum number of switched "ON" microphones (adjusted via S102 on the CSU) cannot be exceeded.
New delegates cannot switch on their microphones, because the SCC has been reset by the high active disable request line.

The audio level comparator in every delegate unit, compares the superimposed audio signal, with the microphone signal, i.e. when a delegate does not speak into his microphone for approximately 30 seconds, the microphone will automatically be switched "OFF".

### Conference

When using the central control desk, the switching control circuit automatically ensures that the microphone button S1, is given the function of the microphone request button.
The SCC senses the central control unit, by a D.C. level on the remote control line. When the D.C. level is low, a central control desk is used and the signal from the microphone button is sent via the request line, to the central control desk, i.e. after a microphone has been requested, the request LED on the delegate´s unit, and the request lamp on the central control desk are switched "ON". By a high D.C. level on the remote control line to the delegate unit, the microphone will be switched on via the switching control circuit. The microphone "ON" LED and the pilot LED are switched "ON" and the request LED and loudspeaker are switched "OFF".
By switching on via the remote line, the delegate´s microphone can only be switched "OFF" by the remote line, or by the delegate himself using his microphone button.
The central control desk operator is also able to switch on a microphone remotely even when a delegate does not request it. After a while the microphone can be switched off by the operator.

### Chairman

The chairman's unit has the same function as the delegate unit, switch S1 controls the on/off, and with the addition of a priority button S2, the chairman is able to gain priority with his microphone.

When S2 is pressed; and remains pressed, the switching control circuit switches "ON" the microphone, and simultaneously switches the microphones LED and pilot LED "ON". The loudspeaker will automatically be switched "OFF".

Pressing S2, allows a low D.C. level to be switched, ensuring that every delegate unit; control circuit is reset, causing the delegates units to be automatically switched "OFF"and their loudspeakers switch "ON".
Upon receiving the low DC level on the priority line, the central supply unit sends a priority attention signal to the audio line, causing a signal to be heard on every delegate unit allowing the chairman to gain priority.
Releasing the priority button S2, the chairman's microphone will be switched "OFF" and the loudspeaker switched "ON". The D.C. level on the priority line increases, causing the switching control circuits not to be reset, therefore all delegates can manually switch on their microphones as normal. The chairman's unit is not equipped with an audio level comparator, therefore his microphone is not automatically switched "OFF" when the delay time is exceeded.

Using the central control desk, the microphone request, function can be remotely controlled. The chairman must indicate to the operator of the central control desk, that he requires remote control.
The operator at the control desk, switches via the remote control line the chairmans request, for microphone "ON".

The central control desk operator is also able to switch on/off the chairmans microphone even when the chairman does not requests for it. When e.g. the chairman forgets to switch off his microphone the operator is able to carry out this function.

### Handmicrophone

The hand-microphone is connected directly to the central supply unit by means of a plug-in unit. The plug-in unit has the same functions as the delegate unit but without a loudspeaker.
The microphone signal is switched from the pre-amplifier, via the connection panel to the audio line.

## Basic Printed Circuit Board and Connector Panel

When the chairman requests priority, the D.C. level on the priority line is low (e.g. 1.5vdc), causing the oscillator on the basic print circuit board to be reset. The oscillator generates a priority tone via the summing pre-amplifer, and is then switched onto the audio line. In all the delegate loudspeakers, the priority tone will be heard.
Signals via the summing amplifier, line in, tape recorder, and telephone coupler are switched to the audio line. The summing amplifier mixes the applied input signals, and the resultant output signal is connected to the audio line.
The internal audio line is via X2-21, and via the attenuator circuit on the connector panel (S101), routed to the two delegate chains BU101, and BU104, and finally to the hand-microphone plug-in unit.

The audio line is amplified by three seperate amplifiers, A, B, and C. Amplifier A, amplifies the audio signal for the telephone coupler, amplifier B, for the line-out, and amplifier C for the tape recorder and interpreters monitor panel LBB 3301, (Floor Signal). Provision is also provided for superimposing the audio signal onto the D.C. level, for the disable request line. Tape-recorder, line-out, and telephone coupler outputs are provide via the connector panel to BU106, BU102, and BU105.
The disable request signal on the connector panel, is distributed into three directions, via BU101 for delegate chain 1, via BU104 for delegate chain 2, and internally to the hand-microphone plug-in unit. The floor signal, is routed via the connector panel to the interpreters monitor panel.

The audio line stabilizer on the basic print circuit board, stabilizes a DC level on the audio line to a constant value. Due to the load on the audio line, the feedback from the stabilizer is adjusted automatically, i.e. an increasing DC level is decreased, and a de-creasing level is increased.

The attenuator control circuit, provides a control signal to the 3db attenuator circuit on the connector panel. When two or more microphones are switched "ON" simultaneously. The input level of a comperator in the control circuit exceeds a certain reference level. The comperator then provides a control signal to the attenuator on the connector panel, which in turn is activated and attenuates the audio signal with 3db.

With S101 connected to the audio line it is possible to adjust the level from the audio for the loudspeakers and the line out signal in steps of 3dB.

The limiter limits the number of microphones which can be switched "ON" simultaneously, by transferring a DC level onto the disable request line, when the maximum number of microphones is reached. New speakers cannot switch "ON" their microphones as long as the number of microphones is at a maximum. The maximum number of microphones can be increased / decreased by adjusting S102 on the connector panel, located on the front side of the central control desk. S102 is a three positioned switch, allowing 1, 3, or 6 microphones to be added, provision is also provided for a control signal to switch "OFF" the audio level comparators, in every delegate´s unit.

When a telephone coupler is used without a fork circuit, the telephone signal which is sent to the CSU, amplified and returned to the telephone line cannot be suppressed. In general this means that the telephone signal is automatically fed back to the telephone. To avoid this problem the fed back telephone signal can be reduced to almost 0 by placing a jumper in the right position. (side tone reduction).

Interpretation

Six channels, the auto-floor, floor, and communication signal are transferred via BU207, connected between the interpreters desks and the interpreters monitor panel LBB 3301. The audio signal from the connector panel is on the int/mon panel, connected via a seperate transformer to the floor line. On the same panel Ch.1/Ch.6, floor and communication are routed via BU209 to the transmitter.
Internally this signal plus the auto-floor are connected to the Monitor Distribution Board LBB 3203/00.
The amplified floor plus Ch.1/Ch.6 are routed via the int/mon panel and back to BU208.
Via connector BU208, a maximum number of 1000 program selectors can be used, to monitor the channels and the floor.

A channel occupied circuit on the int/mon panel, provides LED information to the transmitters connector BU209 and the remote connector BU210. When a channel is occupied, the DC level on the channel line falls below a certain DC level, causing the output of a comparator in the channel occupied circuit to go high, this condition is used to switch "ON" an LED which corresponds to that channel number. The LED information can be derived from BU209 and BU210 in customer made applications.

Transferring a BCD code onto the address lines, via BU210 to the monitor selector on the Monitor Distribution Board, one of the channels, floor or auto-floor can be selected and amplified with the communication signal in the mixing amplifier. The amplifier output is routed via the int/mon panel to the remote socket BU210, and can be used for monitoring loudspeakers.

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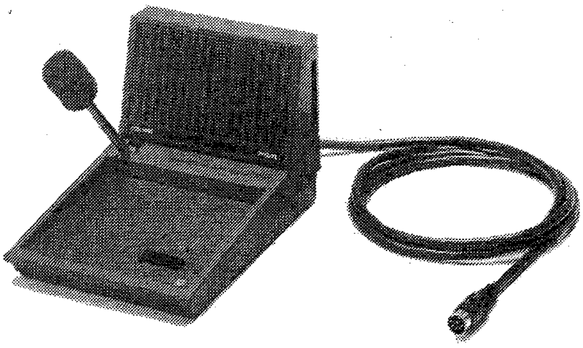
| LBB | 3350/00 | Table Top Delegate Unit |
| LBB | 3450/00 | Table Top Delegate Unit. |



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5. Connection

## 1. INDTRODUCTION DELEGATE UNIT

The delegate unit can be divided into 4 parts (see block diagram fig. 1.)

**Part 1** Microphone Amplifier
Amplifies the microphone input signal, and switches it to the audio line.

**Part 2** Audio Amplifier
Amplifies the audio signal, and distributes it to the loudspeaker and headphone jack.

**Part 3** Auto switch off circuit
Compares the audio signal, and the microphone signal. Automatically switches "off" the microphone, when there is no input from the delegate for approximately 30 to 45 seconds.

**Part 4** Microphone and loudspeaker Switching Circuit
Switches the microphone and loudspeaker on/off, depending on the status of the control signals. The control signals comprise of the Microphone, remote, priority and disable request signals, plus the output signal from the Auto switch off circuit.

## 2. CIRCUIT DESCRIPTION DELEGATE UNIT

(see Circuit diagram Fig. 2 and 3)

When the system is switched "on", capacitor C33 charges to the supply voltage 27v. Resistors R48, and R50 cause the voltage on the + input 5 of IC3b to the lower, than on the negative input 6. This state is valid until the power supply voltage reaches 14v.
The difference negative voltage, between the negative input and the positive input of IC3, causes the comparator output to be 0v. The 0v is applied to the negative input 2 of IC3a, because the voltage on the positive input 3 is +6v, the comparator output will be high i.e. logic "1". Logic "1" resets the flip flop IC5a. Switching on the system, the supply voltage exceeds 14v, the zener diode D11 will conduct, causing the voltage at input 6, to be left at a constant level of 15v. If the power supply voltage exceeds 20v, the voltage at the input of IC3b pin 5, is higher than the 15v on the input 6 causing a positive difference voltage, ensuring that the comparator no longer clamps the voltage to zero.
15v is applied to the negative input of IC3a, pin 2, which is higher than the +6v on the positive input 3, therefore the output from the comparator is 0v, is logic "0". Logic "0" will no longer reset the flip flop IC5, and the delegate unit is now "ready" for use.

### Switching Control Circuit General

The switching control circuit IC5a, IC2d, IC3a, and IC4a/b carries out all the switching functions in the delegaté unit. Switching is due to the state of the call microphone signal, priority-, disable request, and remote control lines, the microphone signal or the audio signal to the loudspeaker. IC5a is a flip flop, who´s output is logic "0"(0v) or logic "1" (15v) depending on its input signals. When the output is 0v, the microphone signal is switched "off" from the pre-amplifier to the audio line. When the output is 15v, the microphone signal via the pre-amplifier, will be switched to the audio line, and the loudspeaker is switched "off".

The priority and disable request line are via a comparator circuit, connected to the reset and data input. The priority signal, when active, ensures that the flip flop will be reset, and the active disable request signal ensures that the data input becomes "0". The microphone call signal, from the microphone button, is applied to the clock input of IC5, and the microphone remote call signal to the set input. The clock or set pulse can make the flip flop output logic "1" (15v), causing the microphone to be switched "on" and the loudspeaker "off".

The audio comparator output, is connected via a comparator to the reset input of IC5. Therefore after the delay time of approximately 30 to 45 seconds, the flip flop will be reset, and the switched "on" microphone is then switched "off".

## Listening

In the listening position, the switching control circuit, switches via the loudspeaker switching circuit, the audio signal, to the audio amplifier and to the loudspeaker. The microphone switching circuit is inactive, because the microphone signal is not connected to the audio line. During listening, the clock input of IC5 is low (logic "0") because the call button has not been pressed. Because their is no priority, the priority line is at 27v. The voltage on the negative input 2 of IC3a, via D9 R31 and R36 is approximately 12v., because the positive input is 6v, the comparator output is 0v, logic "0". Logic "0" is connected to the reset input of IC5. The disable request, connected to pin 13 of IC2d is inactive, therefore the negative input is approximately 0v. The positive input to IC2d pin 12 is positive 10v, therefore the comparator no longer clamps the voltage on the data input to zero. At last their is no remote control, meaning that the remote line which is connected to the set input of IC5 is about 0v. This logic "0" does not set the flip flop.

The output of the flip flop, which is at 0v, is connected via a resistor and capacitor network, to transistor TS5, this circuit forms the microphone switching circuit. 0v on the base of TS5, causes it to not conduct, therefore TS4 which is part of the pre-amplifier is also non-conductive. The microphone signal on the base of TS4 therefore does not reach the audio line, and acts as if it were switched "off".

The loudspeaker switching circuit, consists of TS1, relay K1, and associated components. The 0v from the flip flop output, is applied to the base of TS1, causing it to be non-conductive, therefore no current flow through the relay coil, and the relay is not activated. In this state the contacts are closed, causing the audio signal via the audio amplifier to be applied to the loudspeaker.

## Audio Amplifier

The amplifier consists of IC1$^b$ , TS6, TS7, and associated components. The audio signal from the audio line is fed via C9 and R19 to the positive input of IC1$^b$ , the ground reference is fed to the negative input. The operation amplifier, amplifies the microphone signal, the output is a DC level of approximately 14 volts, on which the audio signal is superimposed. The balanced output stage, TS7 and TS6 provide, the current for driving the low impedance loudspeaker.

## Loudspeaker unit (only in LBB 3350/00)

In the listening position 0v is applied, via X1-5, to the base of TS1, therefore no current flow through the relay coil and the relay is not activated. In this state the contacts are closed via X1-2. The audio signal is applied to the loudspeaker, X1-1 is connected to ground. Because no current flow through the relay coil, the pilot leds D1 until D4 inclusive are not illuminated. In the call position approximately 15v is applied, via X1-5, to the base of TS1, therefore current flow from +15v at X1-6 via the relay coil to ground (X1-4). In this "active state" the relay contacts are opened. The audio signal at X1-2 cannot reach the loudspeaker. The current through D1 until D4 inclusive cause these pilot leds to illuminate.

TS2 and associated circuitry provide for a fast switch over from listening position to call position. At the moment TS1 becomes inductive the current flowing via the pilot leds through the coil of relay K1 is high enough to open the contacts in a "normal" way. When TS1 is not conductive, C1 is charged. The voltage applied via R2 and R3 to the base of TS2 ensures that this transistor is conductive. But because of the non conductive state of TS1 no current can flow via TS2 through K1 to ground.

At the moment the system switches over from listening position to call position, TS1 becomes conductive and current flows via the pilot leds through the relay coil and TS1 to ground. Extra current also flows via TS2 through the relay coil and TS1 to ground. This "extra" current, which only flows for a short moment, ensures that the magnetic field caused by the relay coil is "extra" strong and therefore opens the relay contacts "extra" fast.

This "extra" current may only flow for a short moment through the relay coil. At the moment TS1 becomes conductive. The charged capacitor C1 is connected to ground, C1 discharges via D12 and R1. The voltage over the capacitor decreases, therefore the voltage over R2 and R3, causing the base voltage of TS2 to increase. TS2 becomes less conductive.
The current through the relay coil decreases but remains enough (current via pilot leds) to keep the contacts opened.

## Call Position

In the call position, the microphone switching circuit is activated, by the switching control circuit. The microphone signal is fed via the pre-amplifier and switched to the audio line. The loudspeaker is fed via the loudspeaker switching circuit, and switched "off" from the audio amplifier.

During a call, the clock input of IC5 is logic "1" (15v), because the call button is pressed "in". No priority or remote signals are present, therefore the reset input and the set input are at logic "0". Because disable request is inactive, the data input of IC5 stays 15v, (logic "1"). The data input is high, and the output of the flip flop will be logic "1", (15v) on the positive edge of the clockpulse, caused by pressing the "call button". The inverse flip flop output is now "0", this output is fed back to the data input, which also becomes "0". This means that the next clockpulse (S1) will reset the flip flop. The 15v on output 1 is applied to the base of TS5 in the microphone switching circuit. The transistor is conducting, causing TS4 also to conduct, current can now flow, via the emmitter of TS4 to ground. The microphone signal is taken from the collector, the microphone LED illuminates, due to the current through TS4. The 15v on the output of IC5, via the base of TS1 in the loudspeaker switching circuit, ensures that the transistor conducts. The current which now flows through the relay to ground, allows the contacts to open and the loudspeaker is switched "off" from the audio amplifier, also a current is flowing through the pilot LEDs causing it to illuminate.

## Pre-Amplifier

The pre-amplifier consists of IC1a, TS4 and associated components. A DC voltage is fed via TS1 and applied to the electret microphone line. The current flowing from TS1 to the electret microphone, ensures that the "FET" inside the microphone is conducting. The analogue microphone signal, is also applied to the microphone line, by the microphone itself, and fed via C1 and C2 to the + and - input of the operational amp. IC1a. C1 ensures that the DC voltage for the electret microphone, cannot reach the input of the Op amp. A DC voltage of approximately 4v is fed via R5, and R6 and R8 to the analogue microphone signal on the inputs of IC1a. C2 ensures that this DC voltage is not influenced by TS2 and TS3. The output signal of the Op amp. IC1a if fed back via R11/C48 to the -input and via the resistor between X2-5 and X2-6. The resistance value is dependant, on the sensitivity of the electret microphone. In this way differences in sensitivity of the microphones are compensated. The amplified signal, a DC level of approximately 10v on which the audio signal is superimposed, from the Op amp is applied to the base of TS4.

## Limiter

The limiter consists of TS2, TS3,and associated components. When the output signal of the Op amp IC1a reaches a value greater than ± 0.7v, D1 or D2 conduct, and so will TS2 or TS3. When either of these two transistors is conducting, the input signal from the pre-amplifier decreases. A sample of the current from the analogue microphone signal is then flowing via the conducting transistors to ground. The microphone signal is now limited.
The limiter is divided into two sections, the right section D2 and TS3 is for the positive AC part of the output signal, and the left section D1 and TS2, for the negative AC output signal.

## Resetting "Call" Position

If the call button S1 is pressed again, IC5 receives another positive pulse on its clock input. The inverse output pin 2, was "0", and so the data input of IC5. After the clockpluse, the output pin 1, becomes "0", because the data input is "0". Output 2 is the inverse of output 1, is logic "1", therefore the data input is "1" again. The logic "0" at output 1, activates the loudspeaker switching circuit, and cause the microphone switching circuit to become in-active.
The Ov present on the base of TS1, ensures that it is not-conducting. The loudspeaker is fed via the relay contacts, connected to the audio amplifier. Transistor TS5 is not conducting, due to the Ov on its base, from the output of IC5. Therefore the microphone signal on the base of TS4, is not switched to the audio line.

## Priority

When the chairman wants priority over the delegate microphones, the priority line becomes about 1,5V. Due to R37 and R99 1V is applied to the -input of IC3a then.
Because the 6V on the +input the comperator output is about 15V which is logic "1". Via the reset input IC5 is now reset.
The set input stays "0" and the data input "1". The flip flop output was "1", due to the reset the output becomes "0". The microphone signal is switched off by TS5 which is now nonconductive because of the OV on its base.
The loudspeaker is by TS1 switched to the audio amplifier via the relais contacts.
As long as the priority line is 1,5V the reset input stays "1" and the flip flop resetted, pushing the call button does not influence the switching control circuit. The delegate can not switch on his microphone with his call button.

When the chairman resets his priority, the priority line becomes 27v, 27v is then fed to the -input of the comparator IC3a. Because the +input is 6v, the output is Ov, is logic "0", therefore IC5 is no longer reset. The delegate unit will now be in its normal listening position. Therefore the delegate is able to switch on/off his microphone via the call button.

## Disable Request

When the adjusted number of microphones, are switched "on" (1, 3 or 6 via switch S102) simultaneously. The disable request line reaches approximately 27v. This 27v is applied to the -input of IC2d. Because the +input is connected to 10v the output of the comparator becomes 0v. The data input which is at 15v, is then brought down to approximately 1v, due to the forward voltage on the diode D13. This 1v is logic "0" to the flip flop. When the microphone is swiched "on", during the disable request, the data input is already at "0", because the inverse flip flop output is at 0v. During the disable request, the switched "on" microphones can be switched "off" by pressing the call button. The positive pulse on the clock input, clocks the data which is at "0", to the output. During the disable request, a microphone cannot be switched "on", because the data input is set to "0". The call pulses from the call button, only switches a "0" to the flip flop output.

When the number of switched "on" microphones, is less than the maximum number, adjusted by switch S102, the disable request line becomes 0v.
The output from the comparator IC2d is now not longer clamping the data input to zero. The delegate unit is now in the listening position, and the delegate is now able to switch "on" his microphone, by pressing his call button.

## Remote Control

When a Central Control Desk is used in the system, the call button can also be used as a microphone request button. This can only be achieved, when the control desk is in the manual mode.

Three situations exist :
1. No Central Control desk connected.
2. Central Control desk connected, and positioned in the auto mode.
3. Central Control desk in the manual mode.

When a central control desk is connected in the auto mode, the remote line is higher than 2/3v+. When no desk is connected, resistor R38 which is connected to v+ (27v) ensures that the remote line is higher then 2/3 v+.
The remote line is fed via C29, and connected to the set input of the flip flop. C29 ensures that the DC voltage is blocked and the set input is "0". The delegate is able to switch "on" or "off" his microphone via the call button, as normal.
When the central control desk is in the manual mode, the voltage on the remote line is lower than 2/3 v+. The flip flop IC5a, is not set, due to capacitor C29. Because the -input of IC4a is 2/3v+, the output is now 0v.

When the delegate presses his call button, the output of IC5a becomes 15v, but is clamped by the comparator IC4a. The voltages on the anode of the "request" LED D10 is approximately 1v, therefore the LED illuminates. The 15v on the output of the flip flop, is also applied to the base of TS9, which causes it to conduct. Current flows now from the request line, this is then a sign for the central control desk that a request is made. The operator of the central control desk, makes the remote line higher then 2/3v+, the output of the comparator IC4a then becomes 15v. The voltage at R59 is no longer decreased, therefore the 13v is applied to the base of TS5. The microphone will be switched "on" and via TS1 the loudspeaker "off".

The operator is also able to switch "on" a delegate microphone, even when the delegate doesn't request it. The voltage on the remote line, is now switched from a value much lower than 2/3v+, to a value greater than 2/3v+ (about v+). Because of the fast rise time, and the high voltage step, this pulse passes the differentiation network C29 and R45 and sets the flip flop IC5 via the set input. The output of the flip flop is now 15v, and the microphone is switched on as long as the remote line remains high.

The operator is able to swith "off" the microphone, by switching the voltage on the remote line from a value greater than 2/3v+ (approx. v+), to a voltage much less than 2/3v+, via C26 the - input of IC3a, which is 27V when there is no priority, is decreased for a short moment, causing the voltage at the input to decrease below 6v, and the comparator output then becomes 15v. This pulse then resets the flip flop, and the microphone is then switched "off" and the delegate is in the normal listening position.

When the central control desk is used, the priority line from the chairmans' unit is not connected to the other delegate units, but to the central control desk. When a chairman presses his "priority button", two situations exist : the central control desk is in manual, or in the auto mode.
In "manual mode", the central control desk generates a DC level, which is higher than 6v, but lower than 2/3v+ (18v), on the priority line. This voltage is then applied to the +input of IC4b, ensuring that the comparators output is 0v. When the microphone is switched "on" the 13v on the anode of D10 and resistor R59 is decreased, and the microphone is switched "off".
When the priority button is released by the chairman, the priority line becomes approximately 27v, the output of IC4b 15v, and therefore the voltage on the anode of D10 is no longer decreased and remains at 13v, and the microphone is switched "on" automatically. i.e. when the central control desk is in manual mode, priority from the chairman doesn't switch "off" the microphone, only "mutes" it during the priority call.

In the "auto mode" the microphone is switched "off" whilst the chairman has priority, and remains switched "off" when the priority button is released. In "auto mode", the central control desk, generates a DC level lower than 6v on the priority line, after a priority call. This voltage is then applied to the -input of IC3a, because the +input is at 6v, the comparators output is 15v, flip flop IC5a resets. The microphone is switched "off". When the priority is released, the priority line goes to 27v. The output of IC3a is now at 0v, and the flip flop is no longer reset, the microphone remains switched "off", and the delegate unit is now in the listening position.

## Audio Level Comparator

The audio level comparator, ensures that when a delegate does not speak into his microphone for approximately 30 to 45 seconds, the flip flop IC5, fed via comparator IC3a, will be reset.

At input 3 of IC2a, a DC level of approximately 9v is applied. The microphone signal is applied to the -input 2 of IC2a. The Op. amp IC2a, subtracts the microphone signal from the DC level, and amplifies the resulting signal. The output signal is now at a 9v DC level, which is used to superimpose the amplified microphone signal on. This signal is then applied to the -input of IC2b and at input 5, the disable request signal. The disable request signal, plus a DC level from R28 on the disable request signal, together form a 9v DC level on which the audio signal (other delegates + delegate itself) is superimposed. IC2b subtracts the output of IC2a, which is the 9v on which the microphone signal is superimposed, from the 9v on which the audio signal is superimposed. The output 7, of IC2b is at a DC level of 9v, on which the difference between the audio- and the microphone signal is superimposed. The difference voltage, can reduce the voltage on x, and the output of IC2a, which is the 9v on which the microphone signal is superimposed, can reduce the voltage on Y. When only the the delegate is using his unit, the audio signal is the same as the microphone signal. The Ac difference voltage at the output of IC2b is 0v, only the 9v DC level is on the output. The voltage on x is now 9v plus the forward voltage of D6, adding up to a total of approximately 10v.
When more than one delegate is speaking, the audio signal is higher than the microphone signal. On the output of IC2b, the difference voltage, superimposed on the 9v DC is applied, the negative going voltage of the AC difference signal, ensures that the 10v on x is decreased via D6 and C21.

If the delegate unit is silent, there is no microphone signal, therefore the AC voltage on the 9v DC level at the output of IC2a is at 0v. The voltage at Y is at 9v plus the forward voltage of D7, which in total sums up to approximately 10v. When the delegate microphone is in use, the microphone signal is amplified by IC2a. The negative going voltage of this microphone signal, ensures, that the 10v on Y is decreased, via D7 and C22.

X is applied to the +input of IC2c, and Y to the -input. When X is greater than Y, the output of the Op amp is approximately 15v, and when Y is greater than X the output is 0v. Therefore when the delegate uses his microphone (he has to speak louder when others are using their microphone), the output of IC2c is 15v, C24 is now charged to 15v, because D9 is conducting. When the delegate stops using his microphone the output becomes 0v. Instantly C24 discharges via R35, and the DC level slowly decreases. This decreasing voltage is then fed via R36, and applied to the -input of IC3a. When the voltage becomes lower than approximately 7v, the comparator output which was at 0v, now becomes 15v, and resets the flip flop IC5a, and the microphone will now be switched "off".

The time taken for C24 to discharge, from 15v to approximately 7v is about 30 to 45 seconds. When the microphone is switched "off", the output of IC2c becomes 15v, independant of the number of other switched on microphones. This is because Y is approximately 1v when the delegates unit is not switched "on". The 0v on the output of IC5a, is applied to D8, therefore C22 can only discharge, until the voltage on Y reaches the forward voltage of D8 which is approximately 1v. This forward voltage cannot be exceeded, as long as 0v is applied to the cathode of D8. When the delegate unit is switched "on", by the delegate pressing his call button, then approximately 13v is applied to the cathode of diode D8. C22 can now partly discharge, and the voltage on Y increases to approximately 10v, because of the 9v DC on the cathode of D7, and its forward voltage of approximately 1v.

By placing the jumper S3, in the b-a position, capacitor C24 cannot discharge via R35, therefore the audio level comparator is in-active.

Switching S102, the audio level comparator can be made in-active. In the three position 1, 2, or 6 microphones in non-auto, the switch supplies 0v to the ground reference which is normally 9v DC. This 0v is fed via R30 and C20, to the -input of IC2b and overrules the output signal from IC2a. The output of IC2b is now 0v, therefore X is at 10v. IC2c output, is and remains 15v, therefore the capacitor which is charged, discharges, and the audio level comparator is in-active.

The different switching functions in the delegate unit are listed in the table below.

| Function | Set | Data | Clock | Reset | Q | mic switch. signal. | mic | LS |
|---|---|---|---|---|---|---|---|---|
| Listening | 0 | 1 | 0 | 0 | 0 | 0 | off | on |
| Call | 0 | ↓ | ↑ | 0 | 1 | 1 | on | off |
| Reset call = listening | 0 | ↑ | ↑ | 0 | 0 | 0 | off | on |
| Priority on | 0 | 1 | X | 1 | 0 | 0 | off | on |
| Priority off = listening | 0 | 1 | X | 0 | 0 | 0 | off | on |
| Call | 0 | ↓ | ↑ | 0 | 1 | 1 | on | off |
| Reset call = listening | 0 | ↑ | ↑ | 0 | 0 | 0 | off | on |
| Disable request on | 0 | 0 | X | 0 | 0 | 0 | off | on |
| Disable request off | 0 | 1 | X | 0 | 0 | 0 | off | on |
| Call | 0 | ↓ | ↑ | 0 | 1 | 1 | on | off |
| Reset call = listening | 0 | ↓ | ↑ | 0 | 0 | 0 | off | on |
| Call by use of central control desk = request (manual mode) | 0 | ↓ | ↑ | 0 | 1 | 0 | off | on |
| Remote control on (after request) | 0 | 1 | X | 0 | 1 | 1 | on | off |
| Remote control off (= reset call) | 0 | ↑ | ↑ | 0 | 0 | 0 | off | on |
| Remote control on (no request) |  | ↓ | X | 0 | 1 | 1 | on | off |
| Remote control off | 0 | ↑ | X | ⎍ | 0 | 0 | off | on |
| Microphone off by Audio level comperator | 0 | ↑ | X | ⎍ | 0 | 0 | off | on |

## 3. SPARE PART LIST

### Spare parts list of Delegate Unit LBB 3350

| Description | Code Number |
|---|---|
| Grommet | 5322 462 40211 |
| Jack for headphone | 5322 268 10202 |
| Delegate cable | 5322 321 21658 |
| Plug X13 | 5322 268 44142 |
| Spring for microphone stem | 5322 492 63142 |
| Plug X2 | 5322 268 44152 |
| Microphone | 5322 242 20094 |
| Cap for microphone | 5322 462 40728 |
| Foam cap for microphone | 5322 462 40731 |
| Cap.chip 100 PF 5% 50V for microphone | 4822 122 31765 |
| Socket X13 | 5322 268 24041 |

### Spare Parts list PCB Delegate

| | Description | Codenumber |
|---|---|---|
| | Knob push button S1 | 5322 414 10014 |
| | Rubberplate S1 | 5322 466 91584 |
| C 1 | Cap.chip 10NF | 4822 122 32442 |
| C 2 | Cap.ceramic 100NF10%X7R 50V | 5322 122 32839 |
| C 3 | Cap.electrolyt 10UF 20% 25V | 4822 124 21732 |
| C 4 | Cap.electrolyt 4,7UF 20% 25V | 5322 124 21966 |
| C 5 | Cap.electrolyt 0,47UF 20% 25V | 4822 124 21453 |
| C 6 | Cap.electrolyt 4,7UF 20% 25V | 5322 124 21966 |
| C 7 | Cap.electrolyt 47UF 20% 10V | 5322 124 21975 |
| C 8 | Cap.electrolyt 4,7UF 20% 25V | 5322 124 21966 |
| C 9 | Cap.chip 3,3NF 10% 50V | 4822 122 31969 |
| C 10 | Cap.ceramic 100NF10%X7R 50V | 5322 122 32839 |
| C 11 | Cap.chip 47PF 5% 50V | 4822 122 31772 |
| C 12 | Cap.chip 100PF 5% 50V | 4822 122 31765 |
| C 13 | Cap.chip 100PF 5% 50V | 4822 122 31765 |
| C 14 | Cap.electrolyt 22UF 20% 25V | 4822 122 31969 |
| C 15 | Cap.electrolyt 4,7UF 20% 25V | 5322 124 21966 |
| C 17 | Cap.ceramic 100NF10%X7R 50V | 5322 122 32839 |
| C 18 | Cap.ceramic 82NF 10% 50V | 5322 122 32838 |
| C 20 | Cap.electrolyt 10UF 20% 25V | 4822 124 21732 |
| C 21 | Cap.electrolyt 4,7UF 20% 25V | 5322 124 21966 |
| C 22 | Cap.electrolyt 4,7UF 20% 25V | 5322 124 21966 |
| C 23 | Cap.chip 100PF 5% 50V | 4822 122 31765 |
| C 24 | Cap.electrolyt 100UF 50% 25V | 4822 124 20701 |
| C 25 | Cap.chip 100PF 5% 50V | 4822 122 31765 |

| | | | | |
|---|---|---|---|---|
| C 26 | Cap.chip 4,7NF10%X7R | 25V | | 4822 124 21966 |
| C 27 | Cap.ceramic 100NF10%X7R | 50V | | 5322 122 32839 |
| C 28 | Cap.chip 10NF | | | 4822 122 32442 |
| C 29 | Cap.chip 4,7NF10%X7R | 50V | | 4822 122 31784 |
| C 30 | Cap.chip 100PF 5% | 50V | | 4822 122 31765 |
| C 31 | Cap.chip 100PF 5% | 50V | | 4822 122 31765 |
| C 32 | Cap.electrolyt 47UF 50% | 25V | | 4822 124 20699 |
| C 33 | Cap.electrolyt 47UF 50% | 40V | | 4822 124 20713 |
| C 35 | Cap.electrolyt 22UF 20% | 25V | | 4822 124 20646 |
| C 36 | Cap.electrolyt 47UF 50% | 25V | | 4822 124 20699 |
| C 40 | Cap.ceramic 100NF10%X7R | 50V | | 5322 122 32839 |
| C 44 | Cap.ceramic 100NF10%X7R | 50V | | 5322 122 32839 |
| C 45 | Cap.ceramic 100NF10%X7R | 50V | | 5322 122 32839 |
| C 47 | Cap.chip 22NF 10% | 63V | | 4822 122 31797 |
| C 48 | Cap.chip 470PF 5% | 63V | | 4822 122 31727 |
| D 1 | Diode BAV70 | | | 5322 130 34331 |
| D 2 | Diode BAV70 | | | 5322 130 34331 |
| D 3 | Diode, Reference BZX84-C5V1 | | | 5322 130 32835 |
| D 4 | Diode CQW54-V1 | | | 5322 130 32704 |
| D 5 | Diode BAV70 | | | 5322 130 34331 |
| D 6 | Diode BAV70 | | | 5322 130 34331 |
| D 7 | Diode BAV70 | | | 5322 130 34331 |
| D 8 | Diode BAV70 | | | 5322 130 34331 |
| D 9 | Diode BAV70 | | | 5322 130 34331 |
| D 10 | Diode, Reference TIUG164 | | | 5322 130 32587 |
| D 11 | Diode BZX84-C15 | | | 5322 130 33662 |
| D 12 | Diode BAV70 | | | 5322 130 34331 |
| D 13 | Diode BAV70 | | | 5322 130 34331 |
| D 17 | Diode BAV70 | | | 5322 130 34331 |
| D 19 | Diode, Reference BZV46-2V0 | | | 4822 130 31248 |
| D 20 | Diode, Reference BZX79-B30 | | | 4822 130 34328 |
| IC 1 | Integr.circuit LF353N | | | 5322 209 81395 |
| IC 2 | Integr.circuit LM324D | | | 5322 209 71598 |
| IC 3 | Integr.circuit LM393D | | PHIN | 5322 209 71599 |
| IC 4 | Integr.circuit LM393D | | PHIN | 5322 209 71599 |
| IC 5 | Integr.circuit HEF4013BT | | | 5322 209 14477 |
| R 1 | Res.chip 10K 2% 0,125W | | | 4822 111 90249 |
| R 2 | Res.chip 47K 2% 0,125W | | | 4822 111 90543 |
| R 3 | Res.chip 390E 2% 0,125W | | | 5322 111 90138 |
| R 4 | Res.chip 10K 2% 0,125W | | | 4822 111 90249 |
| R 5 | Res.chip 47K 2% 0,125W | | | 4822 111 90543 |
| R 6 | Res.chip 33K 2% 0,125W | | | 5322 111 90267 |
| R 7 | Res.chip 1K 2% 0,125W | | | 5322 111 90092 |
| R 8 | Res.chip 220K 2% 0,125W | | | 4822 111 90197 |
| R 9 | Res.chip 220E 2% 0,125W | | | 4822 111 90178 |

| | | |
|---|---|---|
| R 11 | Res.chip 10K 2% 0,125W | 4822 111 90249 |
| R 12 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 13 | Res.chip 10K 2% 0,125W | 4822 111 90249 |
| R 14 | Res.chip 560E 2% 0,125W | 5322 111 90113 |
| R 15 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 16 | Res.chip 1K5 2% 0,125W | 4822 111 90151 |
| R 17 | Res.chip 12K 2% 0,125W | 4822 111 90253 |
| R 18 | Res.chip 1M 5% 0,125W | 5322 111 90094 |
| R 19 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 20 | Res.chip 18K 2% 0,125W | 4822 111 90238 |
| R 21 | Res.chip 100E 2% 0,125W | 5322 111 90091 |
| R 22 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 23 | Res.chip 22K 2% 0,125W | 4822 111 90251 |
| R 24 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 25 | Res.chip 470E 2% 0,125W | 5322 111 90109 |
| R 26 | Res.chip 18K 2% 0,125W | 4822 111 90238 |
| R 27 | Res.chip 39K 2% 0,125W | 5322 111 90108 |
| R 28 | Res.chip 100K 2% 0,125W | 4822 111 90124 |
| R 29 | Res.chip 27K 2% 0,125W | 4822 111 90542 |
| R 30 | Res.chip 220K 2% 0,125W | 4822 111 90197 |
| R 31 | Res.chip 18K 2% 0,125W | 4822 111 90238 |
| R 32 | Res.chip 1M 5% 0,125W | 5322 111 90094 |
| R 33 | Res.chip 1M 2% 0,125W | 5322 111 90094 |
| R 34 | Res.chip 1K 2% 0,125W | 5322 111 90092 |
| R 35 | Res.chip 220K 2% 0,125W | 4822 111 90197 |
| R 36 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 37 | Res.chip 1M 5% 0,125W | 5322 111 90094 |
| R 38 | Res.chip 10M 5% 0,125W | 5322 111 91141 |
| R 39 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 40 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 41 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 42 | Res.chip 1K 2% 0,125W | 5322 111 90092 |
| R 43 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 44 | Res.chip 1M 5% 0,125W | 5322 111 90094 |
| R 45 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 46 | Res.chip 47K 2% 0,125W | 4822 111 90543 |
| R 47 | Res.chip 1K 2% 0,125W | 5322 111 90092 |
| R 48 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 49 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 50 | Res.chip 27K 2% 0,125W | 4822 111 90542 |
| R 51 | Res.chip 68K 2% 0,125W | 4822 111 90202 |
| R 52 | Res.chip 33K 2% 0,125W | 5322 111 90267 |
| R 53 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 54 | Res.P.T.C. | 5322 116 44008 |
| R 55 | Res.chip 100K 2% 0,125W | 4822 111 90214 |

| | | | |
|---|---|---|---|
| R 56 | Res.chip 15K 2% 0,125W | | 4822 111 90196 |
| R 57 | Res.chip 15K 2% 0,125W | | 4822 111 90196 |
| R 58 | Res.chip 12K 2% 0,125W | | 4822 111 90253 |
| R 59 | Res.chip 2K7 2% 0,125W | | 4822 111 90569 |
| R 60 | Res.chip 100K 2% 0,125W | | 4822 111 90214 |
| R 72 | Res.chip 10K 2% 0,125W | | 4822 111 90249 |
| R 82 | Res.chip 3K9 2% 0,125W | | 4822 111 90571 |
| R 83 | Res.chip 3K9 2% 0,125W | | 4822 111 90571 |
| R 86 | Res.chip 220K 2% 0,125W | | 4822 111 90197 |
| R 92 | Res.chip 82K 2% 0,125W | | 4822 111 90575 |
| R 93 | Res.chip 68K 2% 0,125W | | 4822 111 90202 |
| R 94 | Res.chip 680K 2% 0,125W | | 4822 111 90162 |
| R 95 | Res.chip 100K 2% 0,125W | | 4822 111 90214 |
| R 96 | Res.chip 5K6 2% 0,125W | | 4822 111 90572 |
| R 97 | Res.chip 100K 2% 0,125W | | 4822 111 90214 |
| R 98 | Res.metal film 390E 5% 2,5W | | 5322 116 54401 |
| R 99 | Res.chip 10K 2% 0,125W | | 4822 111 90249 |
| R 102 | Res.chip 1M 5% 0,125W | | 5322 130 42755 |
| R 103 | Res.chip 100K 2% 0,125W | | 5322 111 90094 |
| S 3 | Pin | | 5322 535 84341 |
| S 3 | Link,jumper 76264 101 Berg | | 5322 290 60298 |
| SK 1 | Switchmechanism S1 mic. button | | 5322 278 14006 |
| TS 1 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 2 | Transistor BC857C | PHIN | 5322 130 42756 |
| TS 3 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 4 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 5 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 6 | Transistor BC817-40 | | 4822 130 42615 |
| TS 7 | Transistor BC807-40 | PHIN | 5322 130 60123 |
| TS 8 | Transistor BC817-40 | | 4822 130 42615 |
| TS 9 | Transistor BC817-40 | | 4822 130 42615 |
| X 5 | Socket,male | | 5322 265 64078 |

## Spare parts list unit cable assy

| Description | Code Number |
|---|---|
| Connector Hirschmann MAS88S | 5322 265 40535 |
| Plug X3 | 5322 267 74025 |
| Socket X3 | 5322 268 24041 |
| Bracket for X3 | 5322 462 44161 |

## Spare parts list Loudsp. enclosure CCS400

| Description | Code Number |
|---|---|
| Loudspeaker AD3371/Y150 | 4822 240 30172 |
| Plastic lens on rear side | 5322 381 10785 |
| Plug X1 | 5322 268 44152 |
| Bracket for X1 | 5322 462 44161 |

## Spare parts list Printed board assy

| | Description | Code Number |
|---|---|---|
| C 1 | Cap.electrolyt 470NF 50% 63V | 4822 124 20719 |
| D 10 | Diode BAV70 | 5322 130 34331 |
| D 11 | Diode BAV70 | 5322 130 34331 |
| D 12 | Diode BAV70 | 5322 130 34331 |
| K 1 | Relay | 5322 280 80524 |
| R 1 | Res.chip 22K 2% 0,125W | 4822 111 90251 |
| R 2 | Res.chip 22K 2% 0,125W | 4822 111 90251 |
| R 3 | Res.chip 10K 2% 0,125W | 4822 111 90249 |
| TS 1 | Transistor BC847C | 5322 130 42755 |
| TS 2 | Transistor BC857C | 5322 130 42756 |

Plug X13 can be used also as plug for X5.
Plug X2 can be used also as plug for X4.
The socket X3 can also be used as socket X2, X1 or X4.
The brackets for plug X1 or X3 can also be used in the plugs X2, X4, X5 and X13.

## Recommended spare parts list of delegate unit LBB 3350

| Description | Code Number |
|---|---|
| Grommet | 5322 462 40211 |
| Jack for headphone | 5322 268 10202 |
| Delegate cable | 5322 321 21658 |
| Plug X13 | 5322 268 44142 |
| Spring for microphone stem | 5322 492 63142 |
| Plug X2 | 5322 268 44152 |
| Microphone | 5322 242 20094 |
| Cap for microphone | 5322 462 40728 |
| Foam cap for microphone | 5322 462 40731 |
| Cap chip 100 PF 5% 50V for microphone | 4822 122 31765 |
| Socket X13 | 5322 268 24041 |

## Spare parts list PCB delegate

| | Description | | Code Number |
|---|---|---|---|
| | Knob push button S1 | | 5322 414 10014 |
| | Rubber plate S1 | | 5322 466 91584 |
| D 3 | Diode, Reference BZX84-C5V1 | | 5322 130 32835 |
| D 4 | Diode CQW54-V1 | | 5322 130 32704 |
| D 10 | Diode, Reference TIUG164 | | 5322 130 32587 |
| D 11 | Diode BZX84-C15 | | 5322 130 33662 |
| D 19 | Diode, Reference BZV46-2V0 | | 4822 130 31248 |
| D 20 | Diode Reference BZX79-B30 | | 4822 130 34328 |
| IC 1 | Integr. circuit LF353N | | 5322 209 81395 |
| IC 2 | Integr. circuit LM324D | | 5322 209 71598 |
| IC 3 | Integr. circuit LM393D | PHIN | 5322 209 71599 |
| IC 4 | Integr. circuit LM393D | PHIN | 5322 209 71599 |
| IC 5 | Integr. circuit HEF4013BT | | 5322 209 14477 |
| SK1 | Switchmechanism S1 mic. button | | 5322 278 14006 |
| TS 1 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 2 | Transistor BC857C | PHIN | 5322 130 42756 |
| TS 3 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 4 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 5 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 6 | Transistor BC817-40 | | 4822 130 42615 |
| TS 7 | Transistor BC807-40 | PHIN | 5322 130 60123 |
| TS 8 | Transistor BC817-40 | | 4822 130 42615 |

|  |  |  |
|---|---|---|
| TS 9 | Transistor BC817-40 | 4822 130 42615 |
| X 5 | Socket male | 5322 265 64078 |

## Spare parts list unit cable assy

| Description | Code Number |
|---|---|
| Connector Hirschmann MAS88S | 5322 265 40535 |
| Plug X3 | 5322 267 74025 |
| Socket X3 | 5322 268 24041 |
| Bracket for X3 | 5322 462 44161 |

## Spare parts list loudsp. enclosure CCS400

| Description | Code Number |
|---|---|
| Loudspeaker AD3371/Y150 | 4822 240 30172 |
| Plastic lens on rear side | 5322 381 10785 |
| Plug X1 | 5322 268 44152 |
| Bracket for X1 | 5322 462 44161 |

## Spare parts list Printed Board assy

|  | Description | Code Number |
|---|---|---|
| K 1 | Relay | 5322 280 80524 |
| TS 1 | Transistor BC847C | PHIN 5322 130 42755 |
| TS 2 | Transistor BC857C | PHIN 5322 139 42756 |

Plug X13 can be used also as plug for X5.
Plug X 2 can be used also as plug for X4.
The socket X3 can also be used as socket X2, X1 or X14.
The brackets for plug X1 of X3 can also be used in the plugs X2, X4, X5 and X13.

## Spare parts list Delegate Unit LBB 3450

| Posnr. | Description | Code Number |
|---|---|---|
| | Grommet | 5322 462 40211 |
| | Jack for headphone | 5322 268 10202 |
| | Delegate cable | 5322 321 21658 |
| | Plug X13 | 5322 268 44142 |
| | Spring for microphone stem | 5322 492 63142 |
| | Plug X2 | 5322 268 44152 |
| | Microphone | 5322 242 20094 |
| | Cap for microphone | 5322 462 40728 |
| | Foam cap for microphone | 5322 462 40731 |
| | Cap.chip 100 PF 5% 50V for microphone | 4822 122 31765 |
| | Socket X13 | 5322 268 24041 |

## Spare parts list PCB Delegate

| Posnr. | Description | | Code Number |
|---|---|---|---|
| | Knob push button S1 | | 5322 414 10014 |
| | Rubberplate S1 | | 5322 466 91584 |
| C 1 | Cap.chip 10NF | | 4822 122 32442 |
| C 2 | Cap.ceramic 100NF10%X7R | 50V | 5322 122 32839 |
| C 3 | Cap.electrolyt 10UF 20% | 25V | 4822 124 21732 |
| C 4 | Cap.electrolyt 4,7UF 20% | 25V | 5322 124 21966 |
| C 5 | Cap.electrolyt 0,47UF 20% | 25V | 5822 124 21453 |
| C 6 | Cap.electrolyt 4,7UF 20% | 25V | 5322 124 21966 |
| C 7 | Cap.electrolyt 47UF 20% | 10V | 5322 124 21975 |
| C 8 | Cap.electrolyt 4,7UF 20% | 25V | 5322 124 21966 |
| C 9 | Cap.chip 3,3 NF 10% | 50V | 4822 122 31969 |
| C 10 | Cap.ceramic 100NF10%X7R | 50V | 5322 122 32839 |
| C 11 | Cap.chip 47PF 5% | 50V | 4822 122 31772 |
| C 12 | Cap.chip 100PF 5% | 50V | 4822 122 31765 |
| C 13 | Cap.chip 100PF 5% | 50V | 4822 122 31765 |
| C 14 | Cap.electrolyt 22UF 20% | 25V | 4822 124 21646 |
| C 15 | Cap.electrolyt 4,7UF 20% | 25V | 5322 124 21966 |
| C 17 | Cap.ceramic 100NF10%X7R | 50V | 5322 122 32839 |
| C 18 | Cap.ceramic 82NF 10% | 50V | 5322 122 32838 |
| C 20 | Cap.electrolyt 10UF 20% | 25V | 4822 124 21732 |
| C 21 | Cap.electrolyt 4,7UF 20% | 25V | 5322 124 21966 |
| C 22 | Cap.electrolyt 4,7UF 20% | 25V | 5322 124 21966 |
| C 23 | Cap.chip 100PF 5% | 50V | 4822 122 31765 |
| C 24 | Cap.electrolyt 100UF 50% | 25V | 4822 124 20701 |
| C 25 | Cap.chip 100PF 5% | 50V | 4822 122 31765 |

|  |  |  |  |  |
|---|---|---|---|---|
| C 26 | Cap.chip 4,7NF10%X7R | 50V |  | 4822 122 31784 |
| C 27 | Cap.ceramic 100NF10%X7R | 50V |  | 5322 122 32839 |
| C 28 | Cap.chip 10NF |  |  | 4822 122 32442 |
| C 29 | Cap.chip 4,7NF10%X7R | 50V |  | 4822 122 31784 |
| C 30 | Cap.chip 100PF 5% | 50V |  | 4822 122 31765 |
| C 31 | Cap.chip 100PF 5% | 50V |  | 4822 122 31765 |
| C 32 | Cap.electrolyt 47UF 50% | 25V |  | 4822 124 20699 |
| C 33 | Cap.electrolyt 47UF 50% | 40V |  | 4822 124 20713 |
| C 35 | Cap.electrolyt 22UF 20% | 25V |  | 4822 124 21646 |
| C 36 | Cap.electrolyt 47UF 50% | 25V |  | 4822 124 20699 |
| C 40 | Cap.ceramic 100NF10%X7R | 50V |  | 5322 122 32839 |
| C 44 | Cap.ceramic 100NF10%X7R | 50V |  | 5322 122 32839 |
| C 45 | Cap.ceramic 100NF10%X7R | 50V |  | 5322 122 32839 |
| C 47 | Cap.chip 22NF 10% | 63V |  | 4822 122 31797 |
| C 48 | Cap.chip 470PF 5% | 63V |  | 4822 122 31727 |
| D 1 | Diode BAV70 |  |  | 5322 130 34331 |
| D 2 | Diode BAV70 |  |  | 5322 130 34331 |
| D 3 | Diode,reference BZX84-C5V1 |  |  | 5322 130 32835 |
| D 4 | Diode CQW54-V1 |  |  | 5322 130 32704 |
| D 5 | Diode BAV70 |  |  | 5322 130 34331 |
| D 6 | Diode BAV70 |  |  | 5322 130 34331 |
| D 7 | Diode BAV70 |  |  | 5322 130 34331 |
| D 8 | Diode BAV70 |  |  | 5322 130 34331 |
| D 9 | Diode BAV70 |  |  | 5322 130 34331 |
| D 10 | Diode TIUG164 |  |  | 5322 130 32587 |
| D 11 | Diode BZX84-C15 |  |  | 5322 130 33662 |
| D 12 | Diode BAV70 |  |  | 5322 130 34331 |
| D 13 | Diode BAV70 |  |  | 5322 130 34331 |
| D 17 | Diode BAV70 |  |  | 5322 130 34331 |
| D 19 | Diode,reference BZV46-2V0 |  |  | 4822 130 31248 |
| D 20 | Diode,reference BZX79-B30 |  |  | 4822 130 34328 |
| IC 1 | Integr.circuit LF353N |  |  | 5322 209 81395 |
| IC 2 | Integr.circuit LM324D |  |  | 5322 209 71598 |
| IC 3 | Integr.circuit LM393D |  | PHIN | 5322 209 71599 |
| IC 4 | Integr.circuit LM393D |  | PHIN | 5322 209 70225 |
| IC 5 | Integr.circuit HEF4013BT |  |  | 5322 209 14477 |
| R 1 | Res.chip 10K 2% 0,125W |  |  | 4822 111 90249 |
| R 2 | Res.chip 47K 2% 0,125W |  |  | 4822 111 90543 |
| R 3 | Res.chip 390E 2% 0,125W |  |  | 5322 111 90138 |
| R 4 | Res.chip 10K 2% 0,125W |  |  | 4822 111 90249 |
| R 5 | Res.chip 47K 2% 0,125W |  |  | 4822 111 90543 |
| R 6 | Res.chip 33K 2% 0,125W |  |  | 5322 111 90267 |
| R 7 | Res.chip 1K 2% 0,125W |  |  | 5322 111 90092 |
| R 8 | Res.chip 220K 2% 0,125W |  |  | 4822 111 90178 |
| R 9 | Res.chip 220E 2% 0,125W |  |  | 4822 111 90178 |

| | | |
|---|---|---|
| R 11 | Res.chip 10K 2% 0,125W | 4822 111 90249 |
| R 12 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 13 | Res.chip 10K 2% 0,125W | 4822 111 90249 |
| R 14 | Res.chip 560E 2% 0,125W | 5322 111 90113 |
| R 15 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 16 | Res.chip 1K5 2% 0,125W | 4822 111 90151 |
| R 17 | Res.chip 12K 2% 0,125W | 4822 111 90253 |
| R 18 | Res.chip 1M 5% 0,125W | 5322 111 90253 |
| R 19 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 20 | Res.chip 18K 2% 0,125W | 4822 111 90238 |
| R 21 | Res.chip 100E 2% 0,125W | 5322 111 90091 |
| R 22 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 23 | Res.chip 22K 2% 0,125W | 4822 111 90251 |
| R 24 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 25 | Res.chip 470E 2% 0,125W | 5322 111 90109 |
| R 26 | Res.chip 18K 2% 0,125W | 4822 111 90238 |
| R 27 | Res.chip 39K 2% 0,125W | 5322 111 90108 |
| R 28 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 29 | Res.chip 27K 2% 0,125W | 4822 111 90542 |
| R 30 | Res.chip 1K 2% 0,125W | 5322 111 90092 |
| R 31 | Res.chip 18K 2% 0,125W | 4822 111 90238 |
| R 32 | Res.chip 1M 5% 0,125W | 5322 111 90094 |
| R 33 | Res.chip 1M 5% 0,125W | 5322 111 90094 |
| R 34 | Res.chip 1K 2% 0,125W | 5322 111 90092 |
| R 35 | Res.chip 220K 2% 0,125W | 4822 111 90197 |
| R 36 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 37 | Res.chip 1M 5% 0,125W | 5322 111 90094 |
| R 38 | Res.chip 10M 5% 0,125W | 5322 111 91141 |
| R 39 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 40 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 41 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 42 | Res.chip 1K 2% 0,125W | 5322 111 90092 |
| R 43 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 44 | Res.chip 100K 2% 0,125W | 5322 111 90094 |
| R 45 | Res.chip 27K 2% 0,125W | 4822 111 90214 |
| R 46 | Res.chip 47K 2% 0,125W | 4822 111 90543 |
| R 47 | Res.chip 1K 2% 0,125W | 5322 111 90092 |
| R 48 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 49 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 50 | Res.chip 27K 2% 0,125W | 4822 111 90542 |
| R 51 | Res.chip 68K 2% 0,125W | 4822 111 90202 |
| R 52 | Res.chip 33K 2% 0,125W | 5322 111 90267 |
| R 53 | Res.chip 100K 2% 0,125W | 4822 111 90214 |
| R 54 | Res.p.t.c. | 5322 116 44008 |
| R 55 | Res.chip 100K 2% 0,125W | 4822 111 90214 |

| | | | |
|---|---|---|---|
| R 56 | Res.chip 15K 2% 0,125W | | 4822 111 90196 |
| R 57 | Res.chip 15K 2% 0,125W | | 4822 111 90196 |
| R 58 | Res.chip 12K 2% 0,125W | | 4822 111 90253 |
| R 59 | Res.chip 2K7 2% 0,125W | | 4822 111 90569 |
| R 60 | Res.chip 100K 2% 0,125W | | 4822 111 90214 |
| R 72 | Res.chip 10K 2% 0,125W | | 4822 111 90249 |
| R 82 | Res.chip 3K9 2% 0,125W | | 4822 111 90571 |
| R 83 | Res.chip 3K9 2% 0,125W | | 4822 111 90571 |
| R 86 | Res.chip 220K 2% 0,125W | | 4822 111 90197 |
| R 92 | Res.chip 82K 2% 0,125W | | 4822 111 90575 |
| R 93 | Res.chip 68K 2% 0,125W | | 4822 111 90202 |
| R 94 | Res.chip 680E 2% 0,125W | | 4822 111 90162 |
| R 95 | Res.chip 100K 2% 0,125W | | 4822 111 90214 |
| R 96 | Res.chip 100K 2% 0,125W | | 4822 111 90572 |
| R 97 | Res.chip 100K 2% 0,125W | | 4822 111 90214 |
| R 98 | Res.metal film 390E 5% 2,5W | | 5322 116 54401 |
| R 99 | Res.chip 10K 2% 0,125W | | 4822 111 90249 |
| R 102 | Res.chip 1M 5% 0,125W | | 5322 111 90094 |
| R 103 | Res.chip 1M 5% 0,125W | | 5322 111 90094 |
| S 3 | Pin | | 5322 535 84341 |
| S 3 | Link, jumber 76264 101 Berg | | 5322 290 60298 |
| SK 1 | Switchmechanism S1 | | 5322 278 14006 |
| TS 1 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 2 | Transistor BC857C | PHIN | 5322 130 42756 |
| TS 3 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 4 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 5 | Transistor BC847C | PHIN | 5322 130 52755 |
| TS 6 | Transistor BC817-40 | | 4822 130 42615 |
| TS 7 | Transistor BC807-40 | PHIN | 5322 130 60123 |
| TS 8 | Transistor BC817-40 | | 4822 130 41615 |
| TS 9 | Transistor BC817-40 | | 4822 130 42615 |
| X 5 | Socket,male | | 5322 265 64078 |

## Spare parts list unit cable assy

| Description | Code Number |
|---|---|
| Connector Hirschmann MAS885 | 5322 265 40535 |
| Plug X3 | 5322 267 74025 |
| Socket X3 | 5322 268 24041 |
| Bracket for X3 | 5322 462 44161 |

## Recommended spare parts list of delegate unit LBB 3450

| Description | Code Number |
|---|---|
| Grommet | 5322 462 40211 |
| Jack for headphone | 5322 268 10202 |
| Delegate cable | 5322 321 21658 |
| Plug X13 | 5322 268 44142 |
| Spring for microphone stem | 5322 492 53142 |
| Plug X2 | 5322 268 44152 |
| Microphone | 5322 242 20094 |
| Cap for microphone | 5322 462 40728 |
| Foam cap for microphone | 5322 462 40731 |
| Cap chip 100 PF 5% 50V for microphone | 4822 122 31765 |
| Socket X13 | 5322 268 24041 |

## Spare parts list PCB Delegate

| | Description | | Code Number |
|---|---|---|---|
| | Knob push button S1 | | 5322 414 10014 |
| | Rubber plate S1 | | 5322 466 91584 |
| D 3 | Diode, Reference BZX84-C5V1 | | 5322 130 32835 |
| D 4 | Diode CQW54-V1 | | 5322 130 32704 |
| D 10 | Diode TIUG164 | | 5322 130 32587 |
| D 11 | Diode BZX84-C15 | | 5322 130 33662 |
| D 19 | Diode, Reference BZV46-2V0 | | 4822 130 31248 |
| D 20 | Diode, Reference BZX79-830 | | 4822 130 34328 |
| IC 1 | Integr. circuit LF353N | | 5322 209 81395 |
| IC 2 | Integr. circuit LM324D | | 5322 209 71598 |
| IC 3 | Integr. circuit LM393D | PHIN | 5322 209 70225 |
| IC 4 | Integr. circuit LM393D | PHIN | 5322 209 70225 |
| IC 5 | Integr. circuit HEF4013BT | | 5322 209 14477 |
| SK 2 | Switchmechanism S1 | | 5322 278 14006 |
| TS 1 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 2 | Transistor BC857C | PHIN | 5322 130 42756 |
| TS 3 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 4 | Transistor BC847C | PHIN | 5322 130 42755 |
| TS 5 | Transistor BC847C | PHIN | 5322 130 52755 |
| TS 6 | Transistor B817-40 | | 4822 130 42615 |
| TS 7 | Transistor BC807-40 | PHIN | 5322 130 60123 |
| TS 8 | Transistor BC817-40 | | 4822 130 41615 |
| TS 9 | Transistor BC817-40 | | 4822 130 42615 |
| X 5 | Socket, male | | 5322 265 64078 |

## Spare parts list unit cable assy

| Description | Code Number |
|---|---|
| Connector Hirschmann MAS885 | 5322 265 40535 |
| Plug X3 | 5322 267 74025 |
| Socket X3 | 5322 268 24041 |
| Bracket for X3 | 5322 462 44161 |

## Spare partlist for extension cable LBB 3305/00

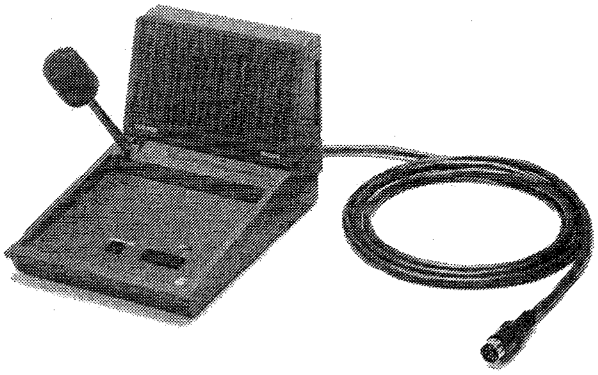
| | |
|---|---|
| Connector 8P Male | 5322 265 40535 |
| Connector 8P Female | 5322 267 50656 |

## Recommended spare parts list for extension cable LBB 3305/00

## Spare partlist for extension cable LBB 3305/00

| | |
|---|---|
| Connector 8P Male | 5322 265 40535 |
| Connector 8P Female | 5322 267 50656 |

| | |
|---|---|
| LBB 3351/00 | Table top chairmans unit with loudspeaker. |
| LBB 3451/00 | Table top chairmans unit without loudspeaker. |



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2. Circuit diagram of chairmans unit.
3. Circuit diagram and location of components loudspeaker unit.
4. Location of components chairmans unit
5. Connection

## 1. INTRODUCTION CHAIRMANS UNIT

The chairmans unit can be divided into 3 parts:
(see block diagram Fig. 1.)

Part 1 **Microphone amplifier**
Amplifies the microphone signal, and switches it to the audio line.

Part 2 **Audio Amplifier**
Amplifies the audio signal, and switches it to the loudspeaker, and headphone jack.

Part 3 **Microphone / Loudspeaker Switching Circuit**
Switches the microphone/loudspeaker "on" or "off", depending on the status of the control signals. Control signals are made up of the following:
(1) Microphone switch signal
(2) Remote call signal
(3) priority call signal

## 2. CIRCUIT DESCRIPTION CHAIRMANS UNIT

(see Circuit diagram Fig. 2 and 3).

Switching "on", as in the delegate unit, flip flop IC5a is reset for a short duration, thereafter the unit is ready for use.

### Switching control circuit (general)

The Switching Control Circuit consists of IC5a, IC3a and IC6, and performs the switching functions in the chairmans unit. Switching is due to the state of the call microphone signal, priority signal, remote call signal, or the audio signal to the loudspeaker. IC5a, is a flip flop who's output is logic "0" i.e. 0v or logic "1" i.e. 15V depending on its input signal. When its output is 0v, the signal on the audioline is fed via an amplifier to the loudspeaker, and the microphone signal is switched "off" at the pre-amplifier to the audioline. When the output of IC5a is 15v (logic "1"), the microphone signal will be switched to the audio line via the pre-amplifier and the loudspeaker will be switched "off".

The microphone call signal, from the microphone button, or from the microphones remote control line via IC6, is fed to the clock input of IC5. The clock input onto IC5, causes the flip flop to produce an output of logic 1 (15v) therefore the microphone will be switched "on". and the loudspeaker "off". The priority signal from the priority call button is fed to TS10 and TS11, which ensures, that when the priority button is pressed, the microphone is switched "on" and or 1.5V DC level is switched via the priority line to the delegate unit (or the central control desk if used).

### Listening

In the listening position, the switching control circuit switches via the loudspeaker switching circuit. The audio signal via the audio amplifier to the loudspeaker, and the microphone signal is then disconnected from the audio line. During listening, the clock input to IC5 is "0", because the call button has not been pressed, and no remote call via IC6 has been applied. Because there is no set pulse, on the set input, the output of the flip flop remains at 0v. This output is then connected to the base of TS5, which with associated components, forms the microphone switching circuit. Because there is no priority call signal, from the priority button, transistor TS10 is not conducting, therefore the base of TS5 remains at 0v. TS4, part of the pre-amplifier; also does not conduct, therefore the microphone signal on the base of TS4, will not reach the audio line, and acts as if it were switched "off".

The loudspeaker switching circuit, includes TS1 and relay K1, and associated components. The 0v on the output of the flip flop, is fed to the base of TS1, therefore the transistor is not conducting, no current flows through the relay, and the relay remains de-energised. In this position the relays contacts are closed, and the audio signal via the audio amplifier, is fed to the loudspeaker.

## Audio Amplifier

The audio amplifier, identical to the one in the delegates unit, amplifies the audio signal, and feeds it to the loudspeaker.

## Call Position

In the call position, the microphone switching circuit is activated by the switching control circuit. The microphone signal is fed via the pre-amplifier, and switched to the audio line. The loudspeaker is switched "off" from the audio amplifier, by the loudspeaker switching circuit. Whilst the call button is pressed in, the clock input of IC5a will be at logic "1". The data input is also logic "1", and because this input is connected to the output pin 2 of IC5a, on the positive edge of the clockpulse, the output of the flip flop is logic 1 (15v). The inverted output on pin 2, is connected to the data input, therefore the input now changes to logic "0". The 15v at IC5a output pin 1 is fed to the base of TS5. Because there is no priority, TS10 and TS11, will not influence the voltage on the base of TS5, therefore TS5 will conduct, allowing the microphone signal on the base of TS4, to be switched to the collector and fed to the audio line.
In a similar way as in the delegate unit, the loudspeaker is switched "off" via TS1 and relay K1. The pre-amplifier (IC1a and TS4) and the limiter (TS2 and TS3) are identical to those used in the delegate unit.
In the same way as in the delegate unit, if the call button S1 is pressed again, the call position will be reset, via IC5.

## Loudspeaker unit (only in LBB 3351/00)

In the listening position 0V is applied, via X1-5, to the base of TS1, therefore no current flow through the relay coil, and the relay is not activated. In this state the contacts are closed via X1-2. The audio signal is applied to the loudspeaker, X1-1 is connected to ground. Because no current flow through the relay coil, the pilot leds D1 until D4 inclusive are not illuminated. In the call position approximately 15V is applied, via X1-5, to the base of TS1, therefore current flow from +15V at X1-6 via the relay coil to ground (X1-4). In this "active state" the relay contacts are opened. The audio signal at X1-2 cannot reach the loudspeaker. The current through D1 until D4 inclusive cause these pilot leds to illuminate.

TS2 and associated circuitry provide for a fast switch over from listening position to call position. At the moment TS1 becomes deductive the current flowing via the pilot leds through the coil of relay K1 is high enough to open the contacts in a "normal" way. When TS1 is not conductive, C1 is charged. The voltage applied via R2 and R3 to the base of TS2 ensures that this transistor is conductive. But because of the non conductive state of TS1 no current can be flow via TS2 through K1 to ground.
At the moment the system switches over from listening position to call position, TS1 becomes conductive and current flows via the pilot leds through the relay coil and TS1 to ground. Extra current also flows via TS2 through the relay coil and TS1 to ground. This "extra" current, which only flows for a short moment, ensures that the magnetic field caused by the relay coil is "extra" strong and therefore opens the relay contacts "extra" fast.
This "extra" current may only flow for a short moment through the relay coil. At the moment TS1 becomes conductive. The charged capacitor C1 is connected to ground, C1 discharges via D12 and R1. The voltage over the capacitor decreases, therefore the voltage over R2 and R3, causing the base voltage of TS2 to increase. TS2 becomes less conductive.
The current through the relay coil decreases, but remains enough (current via pilot leds) to keep the contacts opened.

## Priority

When the chairman requires priority over the delegate microphones, he presses button S2 continuously. The circuit description is as follows, TS11 will conduct, together with TS10. The voltage on the collector of TS10, rises to approximately 15v, this voltage is then applied to the base of TS5, which then conducts. The microphone signal is switched to the audio line and the loudspeaker will be switched "off". Due to TS11 conducting, the priority line is connected to ground, via R63, D18, and D14, the voltage on the priority line is now approximately 1.5v. The delegate unit microphones, will be switched "off".
If the chairman's priority button is released, TS10 and TS11 will not conduct, causing the line to the microphone switching circuit to be 0v. TS5 is not conducting, causing the microphone signal via TS4, not to be switched to the audio line. Because TS1 is not now conducting, the loudspeaker will be switched to the audio line.
The priority line becomes 27v, and the delegates, can now switch "on" and "off" their microphones as normal.

## Disable Request

Because the chairman must always be able to switch "on" his microphone whenever he chooses, his switching control circuit cannot be reset by the disable request line. The disable request line is continued through to the next unit in the chain.

## Remote Control

Only when a central control desk is connected to the system, the microphone callfunction can be remotely controlled. The chairman cannot request, for a remote control call by using a request line, but must somehow attract the attention of the control desk operator, either by hand or some other means. When the chairman has given the operator a sign to switch "on" his microphone, the remote line which is at 15v due to resistor R75, is decreased.
This decreased voltage via R70, is then applied to the negative input of IC6. Because the voltage at the positive input of IC6, via resistors R68 and R69 is greater than at the negative input, the output of the comparator will be 12v i.e. logic "1". Logic "1", is fed to the clock input of the flip flop IC5, via D15 and R42. The data input logic 1 is switched to the output, on the edge of the clock signal. Therefore the flip flop output reaches 15v, which is then fed to the base of TS9, causing it to conduct, the voltage on the remote line is then kept to a DC level of approximately 6V, due the action of the zener diode D16.

This 6v on the input of IC6, is higher than the voltage on the +input, therefore the output of the comparator is approximately 2v, and the clock input to flip flop is once again 0v.
Therefore, when the remote line is at 0v, a complete clockpulse is automatically generated, and fed to the clock pulse input of the flip flop.

When the operator of the central control desk, releases the remote call button, the voltage at the negative input of IC6, becomes greater than the voltage on the positive input, and because of R75, the clock input to the flip flop is at 0v.

## 3. SPARE PARTS LIST

### Spare parts list Chairmans Unit LBB 3351

| Description | Code Number |
|---|---|
| Grommet | 5322 462 40211 |
| Jack for headphone | 5322 268 10202 |
| Chairman cable | 5322 321 21658 |
| Housing,connect plug X13 | 5322 268 44142 |
| Spring for microphone stem | 5322 492 63142 |
| Plug X2 | 5322 268 44152 |
| Microphone | 5322 242 20094 |
| Cap for microphone | 5322 462 40728 |
| Foam cap for microphone | 5322 462 40731 |
| Cap.chip 100PF 5% 50V for microphone | 4822 122 31765 |
| Socket X13 | 5322 268 24041 |

### Spare parts list of PCB chairman

| | Description | | | Code Number |
|---|---|---|---|---|
| | Knob push button S1 | | | 5322 414 10014 |
| | Rubber plate for S1 | | | 5322 466 91584 |
| | Knob push button S2 | | | 5322 414 10013 |
| C 1 | Cap.chip | 10NF | | 4822 122 32442 |
| C 2 | Cap.ceramic | 100NF10%X7R | 50V | 5322 122 32839 |
| C 3 | Cap.electrolyt | 10UF 20% | 25V | 4822 124 21732 |
| C 4 | Cap.electrolyt | 4,7UF 20% | 25V | 5322 124 21966 |
| C 5 | Cap.electrolyt | 0,47UF 20% | 25V | 4822 124 21453 |
| C 6 | Cap.electrolyt | 4,7UF 20% | 25V | 5322 124 21966 |
| C 7 | Cap.electrolyt | 47UF 20% | 10V | 5322 124 21975 |
| C 8 | Cap.electrolyt | 4,7UF 20% | 25V | 5322 124 21966 |
| C 9 | Cap.chip | 3,3NF 10% | 50V | 4822 122 31969 |
| C 10 | Cap.ceramic | 100NF10%X7R | 50V | 5322 122 32839 |
| C 11 | Cap.chip | 47PF 5% | 50V | 4822 122 31772 |
| C 12 | Cap.chip | 100PF 5% | 50V | 4822 122 31765 |
| C 13 | Cap.chip | 100PF 5% | 50V | 4822 122 31765 |
| C 14 | Cap.electrolyt | 22UF 20% | 25V | 4822 124 21646 |
| C 15 | Cap.electrolyt | 4,7UF 20% | 25V | 5322 124 21966 |
| C 25 | Cap.chip | 100PF 5% | 50V | 4822 122 31765 |
| C 28 | Cap.chip | 10NF | | 4822 122 32442 |
| C 30 | Cap.chip | 100PF 5% | 50V | 4822 122 31765 |
| C 31 | Cap.chip | 100PF 5% | 50V | 4822 122 31765 |
| C 32 | Cap.electrolyt | 47UF 50% | 25V | 4822 124 20699 |
| C 33 | Cap.electrolyt | 47UF 50% | 40V | 4822 124 20713 |
| C 35 | Cap.electrolyt | 22UF 20% | 25V | 4822 124 21646 |
| C 36 | Cap.electrolyt | 47UF 50% | 25V | 4822 124 20699 |

|  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
| C 37 | Cap.ceramic | 100NF10%X7R |  |  | 50V |  | 5322 122 32839 |
| C 38 | Cap.chip | 10NF |  |  |  |  | 4822 122 32442 |
| C 39 | Cap.ceramic | 100NF10%X7R |  |  | 50V |  | 5322 122 32839 |
| C 40 | Cap.ceramic | 100NF10%X7R |  |  | 50V |  | 5322 122 32839 |
| C 44 | Cap.ceramic | 100NF10%X7R |  |  | 50V |  | 5322 122 32839 |
| C 46 | Cap.ceramic | 100NF10%X7R |  |  | 50V |  | 5322 122 32839 |
| C 47 | Cap.ceramic | 100NF10%X7R |  |  | 50V |  | 5322 122 32839 |
| C 48 | Cap.chip | 470PF | 5% |  | 63V |  | 4822 122 31727 |
| D 1 | Diode | BAV70 |  |  |  |  | 5322 130 34331 |
| D 2 | Diode | BAV70 |  |  |  |  | 5322 130 34331 |
| D 3 | Diode,reference | BZX84-C5V1 |  |  |  |  | 5322 130 32835 |
| D 4 | Diode | CQW54-V1 |  |  |  |  | 5322 130 32704 |
| D 5 | Diode | BAV70 |  |  |  |  | 5322 130 34331 |
| D 11 | Diode | BZX84-C15 |  |  |  |  | 5322 130 33662 |
| D 12 | Diode | BAV70 |  |  |  |  | 5322 130 34331 |
| D 14 | Diode | BYW56 |  |  |  |  | 5322 130 34973 |
| D 15 | Diode | BAV70 |  |  |  |  | 5322 130 34331 |
| D 16 | Diode,reference | BZV49-C6V2 |  |  |  | PHIN | 5322 130 33672 |
| D 18 | Diode | BAV70 |  |  |  |  | 5322 130 34331 |
| D 19 | Diode,reference | BZV46-2V0 |  |  |  |  | 4822 130 31248 |
| D 20 | Diode,reference | BZX79-B30 |  |  |  |  | 4822 130 34328 |
| IC 1 | Integr.circuit | LF353N |  |  |  |  | 5322 209 81395 |
| IC 3 | Integr.circuit | LM393D |  |  |  | PHIN | 5322 209 71599 |
| IC 5 | Integr.circuit | HEF4013BT |  |  |  |  | 5322 209 14477 |
| IC 6 | Integr.circuit | MC1741CD |  |  |  |  | 5322 209 71597 |
| R 1 | Res.chip | 10K | 2% | 0,125W |  |  | 4822 111 90249 |
| R 2 | Res.chip | 47K | 2% | 0,125W |  |  | 4822 111 90543 |
| R 3 | Res.chip | 390E | 2% | 0,125W |  |  | 4822 111 90138 |
| R 4 | Res.chip | 10K | 2% | 0,125W |  |  | 4822 111 90249 |
| R 5 | Res.chip | 47K | 2% | 0,125W |  |  | 4822 111 90543 |
| R 6 | Res.chip | 33K | 2% | 0,125W |  |  | 5322 111 90267 |
| R 7 | Res.chip | 1K | 2% | 0,125W |  |  | 5322 111 90092 |
| R 8 | Res.chip | 220K | 2% | 0,125W |  |  | 4822 111 90197 |
| R 9 | Res.chip | 220E | 2% | 0,125W |  |  | 4822 111 90178 |
| R 11 | Res.chip | 10K | 2% | 0,125W |  |  | 4822 111 90249 |
| R 12 | Res.chip | 100K | 2% | 0,125W |  |  | 4822 111 90214 |
| R 13 | Res.chip | 10K | 2% | 0,125W |  |  | 4822 111 90249 |
| R 14 | Res.chip | 560E | 2% | 0,125W |  |  | 5322 111 90113 |
| R 15 | Res.chip | 100K | 2% | 0,125W |  |  | 4822 111 90214 |
| R 16 | Res.chip | 1K5 | 2% | 0,125W |  |  | 4822 111 90151 |
| R 17 | Res.chip | 12K | 2% | 0,125W |  |  | 4822 111 90253 |
| R 18 | Res.chip | 1M | 5% | 0,125W |  |  | 5322 111 90094 |
| R 19 | Res.chip | 100K | 2% | 0,125W |  |  | 4822 111 90214 |
| R 20 | Res.chip | 18K | 2% | 0,125W |  |  | 4822 111 90238 |

| | | | | | |
|---|---|---|---|---|---|
| R 21 | Res.chip | 100E | 2% | 0,125W | 5322 111 90091 |
| R 22 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 23 | Res.chip | 22K | 2% | 0,125W | 4822 111 90251 |
| R 24 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 25 | Res.chip | 470E | 2% | 0,125W | 5322 111 90109 |
| R 37 | Res.chip | 1M | 5% | 0,125W | 5322 111 90094 |
| R 42 | Res.chip | 1K | 2% | 0,125W | 5322 111 90092 |
| R 43 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 44 | Res.chip | 1M | 5% | 0,125W | 5322 111 90094 |
| R 45 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 46 | Res.chip | 47K | 2% | 0,125W | 4822 111 90543 |
| R 48 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 49 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 50 | Res.chip | 27K | 2% | 0,125W | 4822 111 90542 |
| R 51 | Res.chip | 68K | 2% | 0,125W | 4822 111 90202 |
| R 52 | Res.chip | 33K | 2% | 0,125W | 5322 111 90267 |
| R 53 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 54 | Res.P.T.C. | | | | 5322 116 44008 |
| R 55 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 56 | Res.chip | 15K | 2% | 0,125W | 4822 111 90196 |
| R 57 | Res.chip | 15K | 2% | 0,125W | 4822 111 90196 |
| R 58 | Res.chip | 12K | 2% | 0,125W | 4822 111 90253 |
| R 59 | Res.chip | 2K7 | 2% | 0,125W | 4822 111 90569 |
| R 60 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 61 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 62 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 63 | Res.metal film | 1K | 5% | 1,6 W | 5322 116 54909 |
| R 64 | Res.P.T.C. | | | | 5322 116 44008 |
| R 65 | Res.chip | 47K | 2% | 0,125W | 4822 111 90543 |
| R 66 | Res.chip | 10K | 2% | 0,125W | 4822 111 90249 |
| R 67 | Res.chip | 1M | 5% | 0,125W | 5322 111 90094 |
| R 68 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 69 | Res.chip | 33K | 2% | 0,125W | 5322 111 90267 |
| R 70 | Res.chip | 100K | 2% | 0,125W | 5322 111 90214 |
| R 71 | Res.P.T.C. | | | | 5322 116 44008 |
| R 72 | Res.chip | 10K | 2% | 0,125W | 4822 111 90249 |
| R 75 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 92 | Res.chip | 82K | 2% | 0,125W | 4822 111 90575 |
| R 93 | Res.chip | 68K | 2% | 0,125W | 4822 111 90202 |
| R 94 | Res.chip | 680E | 2% | 0,125W | 4822 111 90162 |
| R 97 | Res.chip | 100K | 2% | 0,125W | 4822 111 90214 |
| R 98 | Res.metal film | 390E | 5% | 2,5 W | 5322 116 54401 |
| R 102 | Res.chip | 1M | 5% | 0,125W | 5322 111 90094 |
| R 103 | Res.chip | 1M | 5% | 0,125W | 5322 111 90094 |
| SK 1 | Switchmechanism S1 micr. button | | | | 5322 278 14006 |

| | | | | |
|---|---|---|---|---|
| SK 2 | Switchmechanism | S2 prio. button | | 5322 278 14006 |
| TS 1 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 2 | Transistor | BC857C | PHIN | 5322 130 42756 |
| TS 3 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 4 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 5 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 6 | Transistor | BC817-40 | | 4822 130 42615 |
| TS 7 | Transistor | BC807-40 | PHIN | 5322 130 60123 |
| TS 8 | Transistor | BC817-40 | | 4822 130 42615 |
| TS 9 | Transistor | BC817-40 | | 4822 130 42615 |
| TS 10 | Transistor | BC857C | PHIN | 5322 130 42756 |
| TS 11 | Transistor | BC817-40 | | 4822 130 42615 |
| X 5 | Socket,male | | | 5322 265 64078 |

## Spare parts list of Unit Cable Assy

| Description | | Code Number |
|---|---|---|
| Connector | Hirschmann MAS88S | 5322 265 40535 |
| Plug X3 | | 5322 267 74025 |
| Socket X3 | | 5322 268 24041 |
| Bracket for X3 | | 5322 462 44161 |

## Spare parts list of Loudspeaker Enclosure CCS400

| Description | | Code Number |
|---|---|---|
| Loudspeaker | AD3371/Y150 | 4822 240 30172 |
| Plastic lens on rear side | | 5322 381 10785 |
| Plug X1 | | 5322 268 44152 |
| Bracket for X1 | | 5322 462 44161 |

## Spare parts list of Printed Board Assy LBB

| | Description | | | | | | Code Number |
|---|---|---|---|---|---|---|---|
| C 1 | Cap.electrolyt | 470NF | 50% | | 63V | | 4822 124 20719 |
| D 10 | Diode | BAV70 | | | | | 5322 130 34331 |
| D 11 | Diode | BAV70 | | | | | 5322 130 34331 |
| D 12 | Diode | BAV70 | | | | | 5322 130 34331 |
| K 1 | Relay | | | | | | 5322 280 80524 |
| R 1 | Res.chip | 22K | 2% | 0,125W | | | 4822 111 90251 |
| R 2 | Res.chip | 22K | 2% | 0,125W | | | 4822 111 90251 |
| R 3 | Res.chip | 10K | 2% | 0,125W | | | 4822 111 90249 |
| TS 1 | Transistor | BC847C | | | | PHIN | 5322 130 42755 |
| TS 2 | Transistor | BC857C | | | | PHIN | 5322 130 42756 |

## Recommended spare parts list chairmans unit LBB 3351

| Description | Code Number |
|---|---|
| Grommet | 5322 462 40211 |
| Jack for headphone | 5322 268 10202 |
| Chairman cable | 5322 321 21658 |
| Housing,connect plug X13 | 5322 268 44142 |
| Spring for microphone stem | 5322 492 63142 |
| Plug X2 | 5322 268 44152 |
| Microphone | 5322 242 20094 |
| Cap for microphone | 5322 462 40728 |
| Foam cap for microphone | 5322 462 40731 |
| Cap.chip 100PF 5% 50V for microphone | 4822 122 31765 |
| Socket X13 | 5322 268 24041 |

## Spare parts list of PCB chairman

| | Description | | | Code Number |
|---|---|---|---|---|
| | Knob push button S1 | | | 5322 414 10014 |
| | Rubber plate for S1 | | | 5322 466 91584 |
| | Knob push button S2 | | | 5322 414 10013 |
| D 3 | Diode, reference | BZX84-C5V1 | | 5322 130 32835 |
| D 4 | Diode | CQW54-V1 | | 5322 130 32704 |
| D 11 | Diode | BZX84-C15 | | 5322 130 33662 |
| D 16 | Diode, reference | BZV49-C6V2 | PHIN | 5322 130 33672 |
| D 19 | Diode, reference | BZV46-2V0 | | 4822 130 31248 |
| D 20 | Diode, reference | BZX79-830 | | 4822 130 34328 |
| IC 1 | Integr. circuit | LF353N | | 5322 209 81395 |
| IC 3 | Integr. circuit | LM393D | PHIN | 5322 209 71599 |
| IC 6 | Integr. circuit | MC1741CD | | 5322 209 71597 |
| SK 1 | Switchmechanism S1 mic. button | | | 5322 278 14006 |
| SK 2 | Switchmechanism S2 prio. button | | | 5322 278 14006 |
| TS 1 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 2 | Transistor | BC857C | PHIN | 5322 130 42756 |
| TS 3 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 4 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 5 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 6 | Transistor | BC817-40 | | 4822 130 42615 |
| TS 7 | Transistor | BC807-40 | PHIN | 5322 130 60123 |
| TS 8 | Transistor | BC817-40 | | 4822 130 42615 |
| TS 9 | Transistor | BC817-40 | | 4822 130 42615 |

| | | | | |
|---|---|---|---|---|
| TS10 | Transistor | BC857C | PHIN | 5322 130 42756 |
| TS11 | Transistor | BC817-40 | | 4822 130 42615 |
| X 5 | Socket, male | | | 5322 265 64078 |

### Spare parts list of Unit Cable Assy

| Description | | Code Number |
|---|---|---|
| Connector | Hirschmann MAS88S | 5322 265 40535 |
| Plug X3 | | 5322 267 74025 |
| Socket X3 | | 5322 268 24041 |
| Bracket for X3 | | 5322 462 44161 |

### Spare parts list of loudspeaker Enclosure CCS400

| Description | | Code Number |
|---|---|---|
| Loudspeaker | AD3371/Y150 | 4822 240 30172 |
| Plastic lens on rear side | | 5322 381 10785 |
| Plug X1 | | 5322 268 44152 |
| Bracket for X1 | | 5322 462 44161 |

### Spare parts list of Printed Board Assy LBB

| | Description | | | Code Number |
|---|---|---|---|---|
| K 1 | Relay | | | 5322 280 80524 |
| TS1 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS2 | Transistor | BC857C | PHIN | 5322 130 42756 |

Plug X13 can be used also as plug for X5.
Plug X2 can be used also as plug for X4.
The socket X3 can also be used as socket X2, X1 or X4.
The brackets for plug X1 or X3 can also be used in the plugs X2, X4, X5 and X13.

## Spare parts list chairmans unit LBB 3451

| Description | Code Number |
|---|---|
| Grommet | 5322 462 40211 |
| Jack for headphone | 5322 268 10202 |
| Delegate cable | 5322 321 21658 |
| Plug X13 | 5322 268 44142 |
| Spring for microphone stem | 5322 492 63142 |
| Plug X2 | 5322 268 44152 |
| Microphone | 5322 242 20094 |
| Cap for microphone | 5322 462 40728 |
| Foam cap for microphone | 5322 462 40731 |
| Cap. chip 100PF 5% 50V for microphone | 4822 122 31765 |
| Socket X13 | 5322 268 24041 |

## Spare parts list of PCB chairman

| | Description | | | Code Number |
|---|---|---|---|---|
| | Knob push button S1 | | | 5322 414 10014 |
| | Rubber plate S1 | | | 5322 466 91584 |
| | Knob push button S2 | | | 5322 414 10013 |
| C 1 | Cap.chip | 10NF | | 4822 122 32442 |
| C 2 | Cap.ceramic | 100NF10%X7R | 50V | 5322 122 32839 |
| C 3 | Cap.electrolyt | 10UF 20% | 25V | 4822 124 21732 |
| C 4 | Cap.electrolyt | 4,7UF 20% | 25V | 5322 124 21966 |
| C 5 | Cap.electrolyt | 0,47UF 20% | 25V | 4822 124 21453 |
| C 6 | Cap.electrolyt | 4,7UF 20% | 25V | 5322 124 21966 |
| C 7 | Cap.electrolyt | 47UF 20% | 10V | 5322 124 21975 |
| C 8 | Cap.electrolyt | 4,7UF 20% | 25V | 5322 124 21966 |
| C 9 | Cap.chip | 3,3NF 10% | 50V | 4822 122 31969 |
| C 10 | Cap.ceramic | 100NF10%X7R | 50V | 5322 122 32839 |
| C 11 | Cap.chip | 47PF 5% | 50V | 4822 122 31772 |
| C 12 | Cap.chip | 100PF 5% | 50V | 4822 122 31765 |
| C 13 | Cap.chip | 100PF 5% | 50V | 4822 122 31765 |
| C 14 | Cap.electrolyt | 22UF 20% | 25V | 4822 124 21646 |
| C 15 | Cap.electrolyt | 4,7UF 20% | 25V | 5322 124 21966 |
| C 25 | Cap.chip | 100PF 5% | 50V | 4822 122 31765 |
| C 28 | Cap.chip | 10NF | | 4822 122 32442 |
| C 30 | Cap.chip | 100PF 5% | 50V | 4822 122 31765 |
| C 31 | Cap.chip | 100PF 5% | 50V | 4822 122 31765 |
| C 32 | Cap.electrolyt | 47UF 50% | 25V | 4822 124 20699 |
| C 33 | Cap.electrolyt | 47UF 50% | 40V | 4822 124 20713 |
| C 35 | Cap.electrolyt | 22UF 20% | 25V | 4822 124 21646 |

|  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| C 36 | Cap.electrolyt | 47UF | 50% | 25V |  | 4822 124 20699 |
| C 37 | Cap.ceramic | 100NF10%X7R |  | 50V |  | 5322 122 32839 |
| C 38 | Cap.chip | 10NF |  |  |  | 4822 122 32442 |
| C 39 | Cap.ceramic | 100NF10%X7R |  | 50V |  | 5322 122 32839 |
| C 40 | Cap.ceramic | 100NF10%X7R |  | 50V |  | 5322 122 32839 |
| C 44 | Cap.ceramic | 100NF10%X7R |  | 50V |  | 5322 122 32839 |
| C 46 | Cap.ceramic | 100NF10%X7R |  | 50V |  | 5322 122 32839 |
| C 47 | Cap.ceramic | 100NF10%X7R |  | 50V |  | 5322 122 32839 |
| C 48 | Cap.chip | 470PF | 5% | 63V |  | 4822 122 31727 |
| D 1 | Diode | BAV70 |  |  |  | 5322 130 34331 |
| D 2 | Diode | BAV70 |  |  |  | 5322 130 34331 |
| D 3 | Diode,reference | BZX84-C5V1 |  |  |  | 5322 130 32835 |
| D 4 | Diode | CQW54-V1 |  |  |  | 5322 130 32704 |
| D 5 | Diode | BAV70 |  |  |  | 5322 130 34331 |
| D 11 | Diode | BZX84-C15 |  |  |  | 5322 130 33662 |
| D 12 | Diode | BAV70 |  |  |  | 5322 130 34331 |
| D 14 | Diode | BYW56 |  |  |  | 5322 130 34973 |
| D 15 | Diode | BAV70 |  |  |  | 5322 130 34331 |
| D 16 | Diode,reference | BZV49-C6V2 |  |  | PHIN | 5322 130 33672 |
| D 18 | Diode | BAV70 |  |  |  | 5322 130 34331 |
| D 19 | Diode,reference | BZV46-2V0 |  |  |  | 4822 130 31248 |
| D 20 | Diode,reference | BZX79-B30 |  |  |  | 4822 130 34328 |
| IC 1 | Integr.circuit | LF353N |  |  |  | 5322 209 81395 |
| IC 3 | Integr.circuit | LM393D |  |  | PHIN | 5322 209 71599 |
| IC 5 | Integr.circuit | HEF4013BT |  |  |  | 5322 209 14477 |
| IC 6 | Integr.circuit | MC1741CD |  |  |  | 5322 209 11311 |
| R 1 | Res.chip | 10K | 2% | 0,125W |  | 4822 111 90249 |
| R 2 | Res.chip | 47K | 2% | 0,125W |  | 4822 111 90543 |
| R 3 | Res.chip | 390E | 2% | 0,125W |  | 4822 111 90138 |
| R 4 | Res.chip | 10K | 2% | 0,125W |  | 4822 111 90249 |
| R 5 | Res.chip | 47K | 2% | 0,125W |  | 4822 111 90543 |
| R 6 | Res.chip | 33K | 2% | 0,125W |  | 5322 111 90267 |
| R 7 | Res.chip | 1K | 2% | 0,125W |  | 5322 111 90092 |
| R 8 | Res.chip | 220K | 2% | 0,125W |  | 4822 111 90197 |
| R 9 | Res.chip | 220E | 2% | 0,125W |  | 4822 111 90178 |
| R 11 | Res.chip | 10K | 2% | 0,125W |  | 4822 111 90249 |
| R 12 | Res.chip | 100K | 2% | 0,125W |  | 4822 111 90214 |
| R 13 | Res.chip | 10K | 2% | 0,125W |  | 4822 111 90249 |
| R 14 | Res.chip | 560E | 2% | 0,125W |  | 5322 111 90113 |
| R 15 | Res.chip | 100K | 2% | 0,125W |  | 4822 111 90214 |
| R 16 | Res.chip | 1K5 | 2% | 0,125W |  | 4822 111 90151 |
| R 17 | Res.chip | 12K | 2% | 0,125W |  | 4822 111 90253 |
| R 18 | Res.chip | 1M | 5% | 0,125W |  | 5322 111 90094 |
| R 19 | Res.chip | 100K | 2% | 0,125W |  | 4822 111 90214 |
| R 20 | Res.chip | 18K | 2% | 0,125W |  | 4822 111 90238 |
| SK 1 | Switch mechanism S1 mic. button |  |  |  |  | 5322 278 14006 |

| | | | | |
|---|---|---|---|---|
| SK 2 | Switchmechanism | S2 prio. button | | 5322 278 14006 |
| TS 1 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 2 | Transistor | BC857C | PHIN | 5322 130 42756 |
| TS 3 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 4 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 5 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 6 | Transistor | BC817-40 | | 4822 130 42615 |
| TS 7 | Transistor | BC807-40 | PHIN | 5322 130 60123 |
| TS 8 | Transistor | BC817-40 | | 4822 130 42615 |
| TS 9 | Transistor | BC817-40 | | 4822 130 42615 |
| TS 10 | Transistor | BC857C | PHIN | 5322 130 42756 |
| TS 11 | Transistor | BC817-40 | | 4822 130 42615 |
| X 5 | Socket,male | | | 5322 265 64078 |

Spare parts list of Unit Cable Assy

| Description | | Code Number |
|---|---|---|
| Connector | Hirschmann MAS88S | 5322 265 40535 |
| Plug X3 | | 5322 267 74025 |
| Socket X3 | | 5322 268 24041 |
| Bracket for X3 | | 5322 462 44161 |

## Recommended spare parts list Chairmans unit LBB 3451

| Description | Code Number |
|---|---|
| Grommet | 5322 462 40211 |
| Jack for headphone | 5322 268 10202 |
| Delegate cable | 5322 321 21658 |
| Plug X13 | 5322 268 44142 |
| Spring for microphone stem | 5322 492 63142 |
| Plug X2 | 5322 268 44152 |
| Microphone | 5322 242 20094 |
| Cap for microphone | 5322 462 40728 |
| Foam cap for microphone | 5322 462 40731 |
| Cap. chip 100PF 5% 50V for microphone | 4822 122 31765 |
| Socket X13 | 5322 268 24041 |

## Spare parts list of PCB chairman

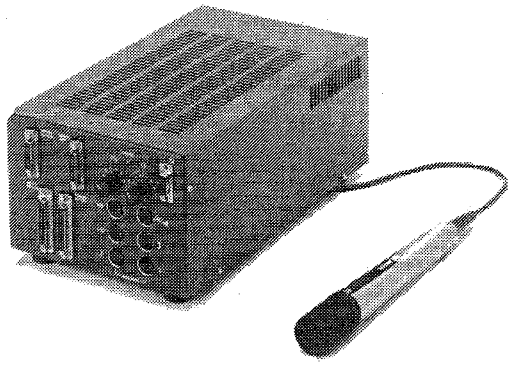
| | Description | | | Code Number |
|---|---|---|---|---|
| | Knob push button S1 | | | 5322 414 10014 |
| | Rubber plate S1 | | | 5322 466 91584 |
| | Knob push button S2 | | | 5322 414 10013 |
| D 3 | Diode, reference | BZX84-C5V1 | | 5322 130 32835 |
| D 4 | Diode | CQW54-V1 | | 5322 130 32704 |
| D 11 | Diode | BZX84-C15 | | 5322 130 33662 |
| D 16 | Diode, reference | BZV49-C6V2 | PHIN | 5322 130 33672 |
| D 19 | Diode, reference | BZV46-2V0 | | 4822 130 31248 |
| D 20 | Diode, reference | BZX79-830 | | 4822 130 34328 |
| IC 1 | Integr. circuit | LF353N | | 5322 209 81395 |
| IC 3 | Integr. circuit | LM393D | PHIN | 5322 209 71599 |
| IC 5 | Integr. circuit | HEF4013BT | | 5322 209 14477 |
| IC 6 | Integr. circuit | MC1741CD | | 5322 209 11311 |
| SK 1 | Switch mechanism | S1 mic. button | | 5322 278 14006 |
| SK 2 | Switch mechanism | S2 prio. button | | 5322 278 14006 |
| TS 1 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 2 | Transistor | BC857C | PHIN | 5322 130 42756 |
| TS 3 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 4 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 5 | Transistor | BC847C | PHIN | 5322 130 42755 |
| TS 6 | Transistor | BC817-40 | | 4822 130 42615 |
| TS 7 | Transistor | BC804-40 | PHIN | 5322 130 60123 |
| TS 8 | Transistor | BC817-40 | | 4822 130 42615 |
| TS 9 | Transistor | BC817-40 | | 4822 130 42615 |

|  |  |  |  |
|---|---|---|---|
| TS10 | Transistor | BC857C | PHIN 5322 130 42756 |
| TS11 | Transistor | BC817-40 | 4822 130 42615 |
| X 5 | Socket, male |  | 5322 265 64078 |

## Spare parts list of Unit Cable Assy

| Description |  | Code Number |
|---|---|---|
| Connector | Hirschmann MAS88S | 5322 265 40535 |
| Plug X3 |  | 5322 267 74025 |
| Socket X3 |  | 5322 268 24041 |
| Bracket for X3 |  | 5322 462 44161 |

## LBB 3300/00 Central Supply Unit (C.S.U.)



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## 1. INTRODUCTION CENTRAL SUPPLY UNIT

The basic assembly of the Central Supply Unit consists of two P.C.B.'s, a connector panel and a "Basic P.C.B.".

The connector panel; connects the various control and audio lines from the basic P.C.B., to the peripheral equipment and vice versa. The loudspeaker level adjustment circuit, and the limiting switch S102, for limiting the maximum number of switched on microphones, is also mounted on this panel.
(See block diagram Fig. 1)

The basic P.C.B. can be sub-divided into 4 parts.
(See block diagram Fig. 2)

### Part 1. Power Supply Unit

Provides the power for the C.S.U., and all associated peripheral equipment.

### Part 2. Mixing Amplifier

Amplifies the priority "oscillator" signal, "line-in" signal, "tape-in" signal and the "conference" signal from the telephone coupler.

### Part 3. Output Amplifier

Consists of three main functions:
(A) Amplifies the audio signal for the telephone coupler
(B) Provides the line-out signal
(C) Provides the floor, tape recorder, and disable request audio signal

### Part 4. Audio Control Circuit

Consists of a stabilizer, which stabilizes the D.C. level on the audio line, a comparator circuit which controls the -3 dB circuit on the connector panel, and a comparator which controls the disable request line.

## 2. CIRCUIT DESCRIPTION CENTRAL SUPPLY UNIT

(See circuit diagram Fig. 3)

Switching on S1, on the Central Supply Unit, powers up the whole system. The mains voltage is transformed by transformer T3, rectified by the bridge rectifier D1, C45 and C48, and fed to the tripple power supply.
The triple power supply is split into three sections:
Section a. TS1, TS2, TS3, TS16
Section b. TS4, TS5, TS6
Section c. TS7, TS8, TS9

If the temperature in the Power Suppy Unit overheats, thermal switch TH1 opens, the voltage on the base of TS15 decreases, causing the transistor to conduct. The Power Supply voltage on the emitter of TS15 is now applied to the base of TS2, TS5 and TS8, causing them to be non-conductive, thereby switching the Power Supply to the system "off", until the temperature is low enough to close TH1.

The three Power Supply parts are identical, except that in section a, transistors TS1 and TS16 are connected in parallel to provide more output current.
The output voltage of the mains supply, causes a voltage across R3 and D7. In section a, this voltage provides a stabilized base voltage for transistor TS3 of about 22 Volts.
Because the voltage on the base of TS3 is 22 Volts, the transistor conducts, and collector current flows through R2, D2, D3, adjusting the base voltage for TS2, causing it to conduct together with TS1 and TS16.

If the current output of the Power Supply increases, i.e. due to an overload, the output voltage decreases, if this output voltage, falls below 21.5 Volts, D4 will conduct causing a voltage drop at R4.
TS3 then becomes less conductive, the collector current decreases causing TS2 to become less conductive. Because the emitter current of TS2 is lower, TS1 and TS16 become less conductive, therefore the output current will be stabilized.

Sections b and c operating characteristics are identical to section a.

Section a. Provides power to the interpreters' desks, the interpreters' monitor panel, and the monitor distribution board. The Power Supply, sections b and c are identical except that they provide less current than section a.

Section b. Provides power for the microphone plug in unit, telephone coupler, and the second delegate chain connected to BU104.

Section c. Provides power for the delegate chain 1 connected to BU101 and the telephone coupler.

The Power Supply voltage of 27V, is divided and stabilized at 15 Volts, 13.5 Volts, and 3.5 Volts, via the voltage stabilizer IC1, and associated circuitry.

## Audio Line Stabilizer

The audio line stabilizer consists of a IC7a, TS11, TS12, TS13 and associated components. The function of the circuit is to stabilize a DC voltage onto the audio line. When the DC voltage on the audio line increases or decreases, and applied to the base of TS13, the transistor conducts in unison. The current flowing via R39, TS12, R31 and R40 to ground is increasing or decreasing, therefore the voltage on the + input of IC7a operational amp, will also increase or decrease depending on the d.c. voltage change on the audio line. When the d.c. voltage on the audio line decreases, the output voltage of IC7a increases, and fed via TS11, the audio line is stabilized, or vice versa. When the d.c. voltage on the audio line increases, the output of IC7a decreases, and the audio line is stabilized.

## Attenuator

The attenuator consists of IC5, IC6, (b.c.d.) and associated circuitry. The action of the circuit is to attenuate the audio signal 3 dB, when two or more microphones are switched on simultaneously. When a microphone is switched on in one of the delegate units, a current flowing from the power supply, is fed via R34 and TS11 to the delegate unit. When only one microphone is switched "on" the current is so that the voltage drop at R34 is very small. This means that the voltage at the emitter of TS11 is approximately 15 Volts, and applied to the negative input of IC5. The voltage at the positive input is about 14.5 Volts, because of the voltage divider R28 and R29, the output of the comparator is now 0 Volts, therefore the switch IC6 will not be activated. When 2 or more microphones are switched "on" the current via R34 and TS11 to the audio line increases, causing the voltage drop at R34 to be larger than 0.5 Volts, therefore the voltage at the negative input of IC5 will be less than 14.5 Volts. Because the positive input is at 14.5 Volts, the comparator output is now at 15 Volts. This logic "1" enables IC6 and closes the switches. One of the resistors R106 to R110, is connected in parallel to the already selected resistor by the volume adjustment switch S101. This parallel resistor causes a 3 dB attenuation of the audio signal. When only one switched "on" microphone is left, the voltage on the negative input of IC5 is larger than the positive input, therefore the switches of IC6 are opened.

## Limiter (disable request circuit)

The limiter circuit consists of IC6a, IC2a and associated components. Its function is to limit the number of delegate microphones; which can be switched "on" simultaneously. The maximum number of switched "on" microphones can be adjusted with switch S102 to either 1, 3 or 6.
The voltage drop at R34 is dependant on the number o switched "on" delegate microphones. The voltage via R22 at the input of IC2a decreases when more microphones are switched "on", because the voltage at R34 increases. The voltage corresponding to the selected number of simultaneous switched "on" microphones is applied to the positive input of IC2a. The corresponding voltage for the number of selected microphones is as follows:

6 microphones = 14 Volts
3 microphones = 14.4 Volts
1 microphones = 14.8 Volts

When the number of simultaneously switched "on" microphones is lower than the selected number, as selected by S102, the voltage on the negative input of IC2a is larger than the voltage on the positive input. The output of the comparator will now be 0 Volts. This output via R50 is connected to the disable request line, which is not active now. When the number of simultaneously switched "on" microphones reaches the selected maximum number, the voltage at R34 increases, and therefore the voltage on the negative input of IC2a is lower than the voltage on the positive input. The comparator output is now at 15 Volts. This 15 Volts on the disable request line causes a disable request in all of the delegate units, which means that no microphones can be switched "on". When one or more microphones are switched "off", the voltage at the negative input, increases to a value higher than at the + input. The comparator output will now be 0 Volts, and the disable request is no longer applied to the delegate units. The limiter can be switched "off" via a remote control line which is connected to BU101 pin 6. The voltage on the remote control line is connected to input 12 of IC6a and must be switched to approximately 15 Volts. This logic "1" enables the switch, to switch a voltage of 15 Volts at input 10 to the output 11, which is connected to the negative input of IC2a. This 15 Volts is always larger than the voltage on the positive input, independant of the maximum number of microphones selected by switch S102. The comparator output will be 0 Volts, therefore the disable request is in-active and cannot be made active because the comparator output stays at 0 Volts.

## Oscillator

The oscillator consists of IC2b, TS10 and TS17, its function is to generate the "attention" signal, when the chairman requires priority over the delegates. When the chairman presses his priority button, the priority line becomes approximately 1.5 Volts, and as a result all switched "on" delegate microphones, switch "off" and their loudspeakers switch "on". The 1.5 Volts via line C in the Central Supply Unit is also applied to the oscillator circuit. Transistor TS10 is conducting and a current flows from the +27 Volts Power Supply (at the emitter) via R23 and also via TS17, C11, R27 and R24 to ground. TS17 becomes conductive and starts the oscillator via the positive input. The oscillator circuit consists of IC2b, R19, C10 and generates a square wave signal of approximately 700 Hz. When TS10 conducts, C11 charges via R27/R24. The charge current ensures that a decreasing voltage across R24 arises. This voltage is shortcircuited to ground in a rythm of 700 Hz by the oscillator and via a low pass filter R70/C12, C13 applied to the pre-amplifier part. A 700 Hz attention signal which decreases slowly to zero, is now heard in the delegate loudspeakers. When the priority button is released, the base of T10 goes to 27 Volts and the transistor becomes non-conductive. C11 discharge via D27, R23 and D24. (discharge time is about 6 times shorter than the charge time) The oscillator circuit is inactive.

## Pre-amplifier

The pre-amplifier consists of IC4a and TS14. The mixing amplifier amplifies the "attention" signal, "line-in" signal, and signals from the telephone coupler and tape recorder. The output signal of the operational amplifier IC4a is fed via the emitter of TS14, and fed back to the negative input via R66 and C30.
The "attention" signal, and the signal from the tape recorder are directly applied to the negative input of the pre-amplifier, the "attention" signal is fed via R70 and C12. The "line-in" signal is applied via a separation transformer T1 and resistor R53. Before the "line-in" signal is amplified, its level can be adjusted by connecting a jumper S3 in one of the two positions, a-b, or a-c. In the a-c position, resistor R52 is connected to ground, and together with the resistance of the secondary winding of T1, forms a voltage divider which ensures that only part of the "line-in" signal is applied to the negative input of IC4a. The telephone coupler signal is fed via R41, R42 and R54, to the negative input of the operation amplifier IC4a. Connecting the jumper S2 in one of the following positions, a-c, a-b, or b-d, the resistance can be adjusted, respectively to 0 Ohm, R42 or R42+R41. Adjusting the resistance, the level of the telephone coupler signal at the input of IC4a is adjusted (-16 dB,-4 dB respectively +6 dB).
The output of IC4a; via D25, is connected to the base of TS14, which applies the amplified signal to the audio line.
The signals on the audio line are amplified by three amplifiers A, B and C. Amplifier B, consists of IC3a. The signal on the audio line is fed to the + input of the operational amplifier, the output signal is fed via a separation transformer T2 to the "line-out" socket BU102. The RC network of R62/C28, R63/C24 in the feed back path and R61/C16 ensures that the low and high frequencies superimposed on the signal are filtered out.
Amplifier C consists of IC3b, which provides the audio signal for the int/mon panel via connector X103. The signal is applied via the voltage divider R64/R65 to the disable request line and fed via R48/R47 and R74 to the tape recorder output BU106-1/4. Connecting jumper S5 in the a-c or a-b position the output impedance to the recorder can be adjusted.
Amplifier A consists of IC4b and IC7b. The audio signal is applied to the negative input of IC4b. The output of the operational amplifier is connected to the negative input of IC7b. By connecting jumper S6, which adjusts the total resistance in the feed back path, the amplification of the operational amplifier IC7b and the level of the output signal can be adjusted. (a-c = -16 dB, a-d = -4 dB and b-c = +6 dB)
The output signal of IC7b is applied to the telephone coupler. When a telephone line is connected to the system, the fork circuit in the telephone coupler ensures that the signal from the telephone to the Central Supply Unit, and the conference signal to the telephone are dealt with separately. In general terms this means that the telephone signal; which is sent to the C.S.U., amplified and returned to the telephone line, can be suppressed or even reduced to zero in the telephone coupler. When a telephone coupler is used without a fork circuit, the signal to and from the telephone cannot be separated from eachother in the coupler. To avoid the telephone signal being fed back which is amplified by part A, the signal is compensated to zero at the junction between IC4b and IC7b.

This is achieved by placing a jumper S4 in position a-b. The signal from the telephone is applied to the output of IC4b. Because the amplified telephone signal is on the output of IC4b and in antiphase, the result will be zero on the input of IC7b. The telephone signal is not fed back to the telephone coupler. The conference signal (audio from the SCU) is normally amplified by IC7b and applied to the telephone coupler.

## 3. SPARE PARTS LIST

### Spare parts list Interface Supply Unit

| | |
|---|---|
| Cap. Knob | 5322 414 30075 |
| Dial knob | 5322 414 70002 |
| Fuse holder | 5322 256 34077 |
| Fuse 2.5A SLOW | 4822 253 30026 |

### Spare parts list PCB contribution

| | | | | |
|---|---|---|---|---|
| BU 101 | Din connector 8P | | | 5322 267 50659 |
| BU 102 | Din connector 5P | | | 4822 267 40182 |
| BU 103 | Din connector 5P | | | 4822 267 40182 |
| BU 104 | Din connector 8P | | | 5322 267 50659 |
| BU 105 | Din connector 7P | | | 4822 264 50101 |
| BU 106 | Din connector 5 p | | | 5322 267 40182 |
| C 101 | 100UF | 50% | 10V | 4822 124 20679 |
| D 101 | CQY94BL-4 | | | 5322 130 32182 |
| R 101 | 2K2 | 2% | 0,125W | 4822 111 90248 |
| R 102 | 33K | 2% | 0,125W | 5322 111 90267 |
| R 103 | 33K | 2% | 0,125W | 5322 111 90267 |
| R 104 | 1M0 | 20% | LOG 0,05W | 5322 101 20924 |
| R 105 | 2K2 | 2% | 0,125W | 4822 111 90248 |
| R 106 | 1K5 | 2% | 0,125W | 4822 111 90151 |
| R 107 | 820E | 2% | 0,125W | 4822 111 90171 |
| R 108 | 470E | 2% | 0,125W | 5322 111 90109 |
| R 109 | 270E | 2% | 0,125W | 4822 111 90154 |
| R 110 | 120E | 2% | 0,125W | 4822 111 90339 |
| R 111 | 1K8 | 2% | 0,125W | 5322 111 90101 |
| R 112 | 820E | 2% | 0,125W | 4822 111 90171 |
| R 113 | 390E | 2% | 0,125W | 5322 111 90138 |
| R 114 | 220E | 2% | 0,125W | 4822 111 90178 |
| R 115 | 120E | 2% | 0,125W | 4822 111 90339 |
| R 116 | 2K2 | 2% | 0,125W | 4822 111 90248 |
| R 117 | 22K | 2% | 0,125W | 4822 111 90251 |
| R 118 | 10K | 2% | 0,125W | 4822 111 90249 |
| R 119 | 100E | 2% | 0,125W | 5322 111 90091 |
| R 120 | 47K | 2% | 0,125W | 4822 111 90543 |
| S 101 | rotary switch | | | 5322 273 80317 |
| S 102 | rotary switch | | | 5322 273 80317 |

## Spare parts list P.C.B. Basic

| | | | | |
|---|---|---|---|---|
| | Isolating bush between PCB and cooling plate | | | 4822 255 40174 |
| | Jumper S2, 5, 4, 3 or 6 | | | 5322 290 60298 |
| C 1 | 3300UF | 30% | 63V | 5322 124 40805 |
| C 2 | 470UF | 20% | 40V | 5322 124 21729 |
| C 3 | 470UF | 20% | 40V | 5322 124 21729 |
| C 4 | 470UF | 20% | 40V | 5322 124 21729 |
| C 5 | 100NF | 10% X7R | 50V | 5322 122 32839 |
| C 6 | 47UF | 50% | 25V | 4822 124 20699 |
| C 7 | 10UF | 20% | 25V | 4822 124 21747 |
| C 8 | 100PF | 5% | 50V | 4822 122 31765 |
| C 9 | 22UF | 50% | 25V | 4822 124 20698 |
| C 10 | 10NF | | | 4822 122 32442 |
| C 11 | 4,7UF | 50% | 63V | 4822 124 20726 |
| C 12 | 10NF | | | 4822 122 32442 |
| C 13 | 4,7NF | 10% X7R | 50V | 4822 122 31784 |
| C 14 | 10NF | | | 4822 122 32442 |
| C 15 | 10UF | 50% | 40V | 4822 124 20708 |
| C 16 | 33NF | 10% | 63V | 5322 122 31848 |
| C 17 | 33NF | 10% | 63V | 5322 122 31848 |
| C 18 | 100PF | 5% | 50V | 4822 122 31765 |
| C 19 | 3,9NF | | 50V | 4822 122 32566 |
| C 20 | 22UF | 50% | 25V | 4822 124 20698 |
| C 21 | 22UF | 50% | 25V | 4822 124 20698 |
| C 22 | 22UF | 50% | 25V | 4822 124 20698 |
| C 23 | 100PF | 5% | 50V | 4822 122 31765 |
| C 25 | 100PF | 5% | 50V | 4822 122 31765 |
| C 26 | 100UF | 50% | 25V | 4822 124 20701 |
| C 27 | 220PF | 5% | 63V | 4822 122 31965 |
| C 28 | 220PF | 5% | 63V | 4822 122 31965 |
| C 29 | 1UF | 50% | 63V | 4822 124 20722 |
| C 30 | 100PF | 5% | 50V | 4822 122 31765 |
| C 31 | 22UF | 20% | 25V | 4822 124 21646 |
| C 32 | 22UF | 20% | 25V | 4822 124 21646 |
| C 33 | 560PF | 5% | 50V | 4822 122 31773 |
| C 34 | 100PF | 5% | 50V | 4822 122 31765 |
| C 35 | 10UF | 20% | 25V | 4822 124 21747 |
| C 36 | 10UF | 20% | 25V | 4822 124 21747 |
| C 37 | 47NF | 10% | 50V | 4822 122 32542 |
| C 38 | 22UF | 50% | 25V | 4822 124 20698 |
| C 39 | 22UF | 50% | 25V | 4822 124 20698 |
| C 40 | 47NF | 10% | 50V | 4822 122 32542 |
| C 41 | 47NF | 10% | 50V | 4822 122 32542 |
| C 42 | 47NF | 10% | 50V | 4822 122 32542 |
| C 43 | 10NF | | | 4822 122 32442 |

| | | | |
|---|---|---|---|
| C 44 | 1500NF 10% | 100V | 4822 121 42031 |
| C 45 | 4,7NF 10% X7R | 50V | 4822 122 31784 |
| C 46 | 4,7NF 10% X7R | 50V | 4822 122 31784 |
| C 47 | 4,7NF 10% X7r | 50V | 4822 122 31784 |
| C 48 | 4,7NF 10% X7R | 50V | 4822 122 31784 |
| C 49 | 220NF 10% | 63V | 4822 121 41673 |
| C 50 | 1000PF 5% | 50V | 4822 122 31746 |
| C 51 | 470NF 10% | 63V | 4822 121 41674 |
| C 52 | 100PF 5% | 50V | 4822 122 31765 |
| C 53 | 22UF 20% | 25V | 4822 124 21646 |
| C 54 | 47NF 10% | 50V | 4822 122 32542 |
| D 1 | BY224-600 | | 5322 130 34761 |
| D 2 | BAV70 | | 5322 130 34331 |
| D 3 | BAV70 | | 5322 130 34331 |
| D 4 | BAV70 | | 5322 130 34331 |
| D 5 | BAV70 | | 5322 130 34331 |
| D 6 | BZX84-C5V1 | | 5322 130 32835 |
| D 7 | BZX84-C22 | | 5322 130 33725 |
| D 8 | BAV70 | | 5322 130 34331 |
| D 9 | BAV70 | | 5322 130 34331 |
| D 10 | BAV70 | | 5322 130 34331 |
| D 11 | BAV70 | | 5322 130 34331 |
| D 12 | BZX84-C5V1 | | 5322 130 32835 |
| D 13 | BZX84-C22 | | 5322 130 33725 |
| D 14 | BAV70 | | 5322 130 34331 |
| D 15 | BAV70 | | 5322 130 34331 |
| D 16 | BAV70 | | 5322 130 34331 |
| D 17 | BAV70 | | 5322 130 34331 |
| D 18 | BZX84-C5V1 | | 5322 130 32835 |
| D 19 | BZX84-C22 | | 5322 130 33725 |
| D 20 | BYW56 | | 5322 130 34973 |
| D 22 | BAV70 | | 5322 130 34331 |
| D 23 | BYW56 | | 5322 130 34973 |
| D 24 | BAV70 | | 5322 130 34331 |
| D 25 | BZX84-C5V1 | | 5322 130 32835 |
| D 26 | BZX84-C5V1 | | 5322 130 32835 |
| D 27 | BAV70 | | 5322 130 34331 |
| IC 1 | MC7815CT | | 4822 209 80808 |
| IC 2 | MC1458N | | 4822 209 81349 |
| IC 3 | LF353N | | 5322 209 81395 |
| IC 4 | LF353N | | 5322 209 81395 |
| IC 5 | TDB0156DP | | 5322 209 82804 |
| IC 6 | HEF4066BT | | 5322 209 14542 |
| IC 7 | LF353N | | 5322 309 81395 |

|  |  |  |  |  |
|---|---|---|---|---|
| R 1 | 3E9 | 5% | 1,6 W | 4822 116 51865 |
| R 2 | 2K2 | 1% | 0,6 W | 4822 116 53025 |
| R 3 | 8K2 | 2% | 0,125W | 5322 111 90118 |
| R 4 | 470E | 2% | 0,125W | 5322 111 90109 |
| R 5 | 22K | 1% | 0,6 W | 5322 116 53286 |
| R 6 | 3E6 | 5% | 2,0 W | 4822 116 53281 |
| R 7 | 2K2 | 1% | 0,6 W | 4822 116 53025 |
| R 8 | 8K2 | 2% | 0,125W | 5322 111 90118 |
| R 9 | 470E | 2% | 0,125W | 5322 111 90109 |
| R 10 | 22K | 1% | 0,6 W | 5322 116 53286 |
| R 11 | 3E6 | 5% | 2,0 W | 4822 116 53281 |
| R 12 | 2K2 | 1% | 0,6 W | 4822 116 53025 |
| R 13 | 8K2 | 2% | 0,125W | 5322 111 90118 |
| R 14 | 470E | 2% | 0,125W | 5322 111 90109 |
| R 15 | 22K | 1% | 0,6 W | 5322 116 53286 |
| R 16 | 3E9 | 5% | 1,6 W | 4822 116 51865 |
| R 17 | 100K | 2% | 0,125W | 4822 111 90214 |
| R 18 | 100K | 2% | 0,125W | 4822 111 90214 |
| R 19 | 100K | 2% | 0,125W | 4822 111 90214 |
| R 20 | 22K | 2% | 0,125W | 4822 111 90251 |
| R 21 | 10K | 2% | 0,125W | 4822 111 90249 |
| R 22 | 10K | 2% | 0,125W | 4822 111 90249 |
| R 23 | 10K | 2% | 0,125W | 4822 111 90249 |
| R 24 | 47K | 2% | 0,125W | 4822 111 90543 |
| R 25 | 47K | 2% | 0,125W | 4822 111 90543 |
| R 26 | 150K | 2% | 0,125W | 5322 111 90099 |
| R 27 | 47K | 2% | 0,125W | 4822 111 90543 |
| R 28 | 150K | 2% | 0,125W | 5322 111 90099 |
| R 29 | 5K6 | 2% | 0,125W | 4822 111 90572 |
| R 30 | 3K3 | 2% | 0,125W | 4822 111 90157 |
| R 31 | 10K | 2% | 0,125W | 4822 111 90249 |
| R 32 | 100K | 2% | 0,125W | 4822 111 90214 |
| R 33 | 47K | 2% | 0,125W | 4822 111 90543 |
| R 34 | 43R | 1% | 0,6 W | 5322 116 53597 |
| R 36 | 15K | 2% | 0,125W | 4822 111 90196 |
| R 37 | 100K | 2% | 0,125W | 4822 111 90214 |
| R 38 | 33K | 2% | 0,125W | 5322 111 90267 |
| R 39 | 10K | 2% | 0,125W | 4822 111 90249 |
| R 40 | 22K | 2% | 0,125W | 4822 111 90251 |
| R 41 | 47K | 2% | 0,125W | 4822 111 90543 |
| R 42 | 18K | 2% | 0,125W | 4822 111 90238 |
| R 43 | 910E | 1% | 0,6 W | 4822 116 52868 |
| R 44 | 330E | 2% | 0,125W | 5322 111 90106 |
| R 45 | 10K | 2% | 0,125W | 4822 111 90249 |

|  |  |  |
|---|---|---|
| R 46 | 10K 2% 0,125W | 4822 111 90249 |
| R 47 | 680E 2% 0,125W | 4822 111 90162 |
| R 48 | 10K 2% 0,125W | 4822 111 90249 |
| R 49 | 62R 1% 0,6 W | 5322 116 53598 |
| R 50 | 10K 2% 0,125W | 4822 111 90249 |
| R 51 | 100K 2% 0,125W | 4822 111 90214 |
| R 52 | 82E 2% 0,125W | 4822 111 90124 |
| R 53 | 3K9 2% 0,125W | 4822 111 90571 |
| R 54 | 15K 2% 0,125W | 4822 111 90196 |
| R 55 | 10K 2% 0,125W | 4822 111 90249 |
| R 56 | 33K 2% 0,125W | 5322 111 90267 |
| R 57 | 3K3 2% 0,125W | 4822 111 90157 |
| R 58 | 220K 2% 0,125W | 4822 111 90197 |
| R 59 | 33K 2% 0,125W | 5322 111 90267 |
| R 60 | 1K 2% 0,125W | 5322 111 90092 |
| R 61 | 100K 2% 0,125W | 4822 111 90214 |
| R 62 | 33K 2% 0,125W | 5322 111 90267 |
| R 63 | 3K9 2% 0,125W | 4822 111 90571 |
| R 64 | 1K5 2% 0,125W | 4822 111 90151 |
| R 65 | 68E 2% 0,125W | 4822 111 90203 |
| R 66 | 33K 2% 0,125W | 5322 111 90267 |
| R 67 | 100K 2% 0,125W | 4822 111 90214 |
| R 68 | 680E 2% 0,125W | 4822 111 90162 |
| R 69 | 82K 2% 0,125W | 4822 111 90575 |
| R 70 | 220K 2% 0,125W | 4822 111 90197 |
| R 71 | 100E 2% 0,125W | 5322 111 90091 |
| R 72 | 33K 2% 0,125W | 5322 111 90267 |
| R 73 | 36K 1% 0,6 W | 5322 116 53596 |
| R 74 | 220K 2% 0,125W | 4822 111 90197 |
| R 75 | 100K 2% 0,125W | 4822 111 90214 |
| R 76 | 100K 2% 0,125W | 4822 111 90214 |
| R 77 | 100K 2% 0,125W | 4822 111 90214 |
| R 78 | 1M 5% 0,125W | 5322 111 90094 |
| R 79 | 1M 5% 0,125W | 5322 111 90094 |
| R 80 | 4K7 2% 0,125W | 5322 111 90111 |
| R 81 | 47K 2% 0,125W | 4822 111 90543 |
| R 82 | 10K 2% 0,125W | 4822 111 90249 |
| R 83 | 10K 2% 0,125W | 4822 111 90249 |
| S 2 | Pins for jumper S2 | 5322 535 84341 |
| S 3 | Pins for jumper S3 | 5322 535 84341 |
| S 4 | Pins for jumper S4 | 5322 535 84341 |
| S 5 | Pins for jumper S5 | 5322 535 84341 |
| S 6 | Pins for jumper S6 | 5322 535 84341 |
| T 1 | Line in transformer | 5322 140 10267 |
| T 2 | Line out transformer | 5322 140 60264 |

| | | | |
|---|---|---|---|
| TS 1 | BDT96 | | 5322 130 42209 |
| TS 2 | BC557C | | 4822 130 42231 |
| TS 3 | BC846B | PHIN | 5322 130 60159 |
| TS 4 | BDT96 | | 5322 130 42209 |
| TS 5 | BC557C | | 4822 130 42231 |
| TS 6 | BC846B | PHIN | 5322 130 60159 |
| TS 7 | BDT96 | | 5322 130 42209 |
| TS 8 | BC557C | | 4822 130 42231 |
| TS 9 | BC846B | PHIN | 5322 130 60159 |
| TS 10 | BC857C | PHIN | 5322 130 42756 |
| TS 12 | BC847C | PHIN | 5322 130 42755 |
| TS 13 | BC847C | PHIN | 5322 130 42755 |
| TS 14 | BC847C | PHIN | 5322 130 42755 |
| TS 15 | BC857C | PHIN | 5322 130 42756 |
| TS 16 | BDT96 | | 5322 130 42209 |
| TS 17 | BC857C | PHIN | 5322 130 42756 |

## Recommended spare parts list Interface Supply Unit

| | |
|---|---|
| Cap. knob | 5322 414 30075 |
| Dial knob | 5322 414 70002 |
| Fuse holder | 5322 256 34077 |

## Spare parts list PCB contribution

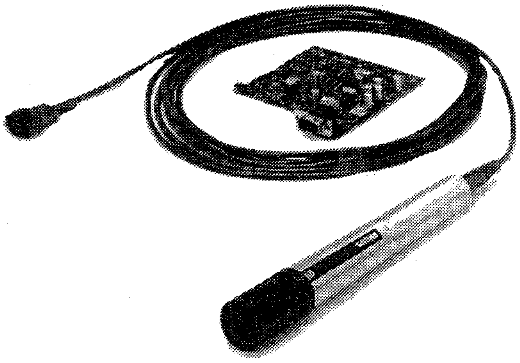
| | | |
|---|---|---|
| BU 101 | Din connector 8P | 5322 267 50659 |
| BU 102 | Din connector 5P | 4822 267 40182 |
| BU 103 | Din connector 5P | 4822 267 40182 |
| BU 104 | Din connector 8P | 5322 267 50659 |
| BU 105 | Din connector 7P | 4822 264 50101 |
| BU 106 | Din connector 5P | 4822 267 40182 |
| D 101 | CQY94BL-4 | 5322 130 32182 |
| S 101 | Rotary switch | 5322 273 80317 |
| S 102 | Rotary switch | 5322 273 80317 |

## Spare parts list P.C.B. Basic

| | | | |
|---|---|---|---|
| | Isolating bush between PCB and cooling plate | | 4822 255 40174 |
| C 1 | 3300UF 30% | 63V | 5322 124 40805 |
| C 2 | 470UF 20% | 40V | 5322 124 21729 |
| C 3 | 470UF 20% | 40V | 5322 124 21729 |
| C 4 | 470UF 20% | 40V | 5322 124 21729 |
| D 1 | BY224-600 | | 5322 130 34761 |
| D 6 | BZX84-C5V1 | | 5322 130 32835 |
| D 7 | BZX84-C22 | | 5322 130 33725 |
| D 12 | BZX84-C5V1 | | 5322 130 32835 |
| D 13 | BZX84-C22 | | 5322 130 33725 |
| D 18 | BZX84-C5V1 | | 5322 130 32835 |
| D 19 | BZX84-C22 | | 5322 130 33725 |
| D 25 | BZX84-C5V1 | | 5322 130 32835 |
| D 26 | BZX84-C5V1 | | 5322 130 32835 |
| IC 1 | MC7815CT | | 4822 209 80808 |
| IC 2 | MC1458N | | 4822 209 81349 |
| IC 3 | LF353N | | 5322 209 81395 |
| IC 4 | LF353N | | 5322 209 81395 |
| IC 5 | TDB0156DP | | 5322 209 82804 |
| IC 6 | HEF40668T | | 5322 209 14542 |
| IC 7 | LF353N | | 5322 309 81395 |

|  |  |  |  |
|---|---|---|---|
| T 1 | Line in transformer |  | 5322 140 10267 |
| T 2 | Line out transformer |  | 5322 140 60264 |
| TS 1 | BDT96 |  | 5322 130 42209 |
| TS 2 | BC557C |  | 4822 130 42231 |
| TS 3 | BC846B | PHIN | 5322 130 60159 |
| TS 4 | BDT96 |  | 5322 130 42209 |
| TS 5 | BC557C |  | 4822 130 42231 |
| TS 6 | BC846B | PHIN | 5322 130 60159 |
| TS 7 | BDT96 |  | 5322 130 42209 |
| TS 8 | BC557C |  | 4822 130 42231 |
| TS 9 | BC846B | PHIN | 5322 130 60159 |
| TS 10 | BC857C | PHIN | 5322 130 42756 |
| TS 12 | BC847C | PHIN | 5322 130 42755 |
| TS 13 | BC847C | PHIN | 5322 130 42755 |
| TS 14 | BC847C | PHIN | 5322 130 42755 |
| TS 15 | BC857C | PHIN | 5322 130 42756 |
| TS 16 | BDT96 |  | 5322 130 42209 |
| TS 17 | BC857C | PHIN | 5322 130 42756 |

LBB 3202/00 Microphone plug in unit



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2. Circuit diagram of microphone plug in unit.
3. Location of components microphone plug in unit.

## 1. INTRODUCTION MICROPHONE PLUG IN UNIT

The microphone plug in unit can be divided into 3 parts (see block diagram fig. 1).

Part 1. Microphone Amplifier
Amplifies the microphone input signal, and switches it to the audio line.

Part 2. Auto switch off circuit
Compares the audio signal and the microphone signal. Automatically switches "off" the microphone, when there is no input from the delegate for approximately 30 to 45 seconds.

Part 3. Microphone Switching Circuit
Switches the microphone on/off, depending on the status of the control signals. The control signals comprise of the Microphone, remote, priority and disable request signals, plus the output signal from the Auto switch off circuit.

## 2. CIRCUIT DESCRIPTION MICROPHONE PLUG IN UNIT

(see Circuit diagram Fig. 2)

When the system is switched "on", capacitor C33 charges to the supply voltage 27v. Resistors R48, and R50 cause the voltage on the +input 5 of IC3b to the lower, than on the negative input 6. This state is valid until the power supply voltage reaches 14v.
The difference negative voltage, between the negative input and the positive input of IC3, causes the comparator output to be 0v. The 0v is applied to the negative input 2 of IC3a, because the voltage on the positive input 3 is +6v, the comparator output will be high i.e. logic "1". Logic "1" resets the flip flop IC5a. Switching on the system, the supply voltage exceeds 14v, the zener diode D11 will conduct, causing the voltage at input 6, to be left at a constant level of 15v. If the power supply voltage exceeds 20v, the voltage at the input of IC3b pin 5, is higher than the 15v on the input 6 causing a positive difference voltage, ensuring that the comparator no longer clamps the voltage to zero. 15v is applied to the negative input of IC3a, pin 2, which is higher than the +6v on the positive input 3, therefore the output from the comparator is 0v, is logic "0". Logic "0" will not reset the flip flop IC5, and the plug in unit is now "ready" for use.

### Switching Control Circuit General

The switching control circuit IC5a, IC3a and IC4a/b carries out all the switching functions in the microphone plug in unit. Switching is due to the state of the call microphone signal, priority-, disable request and the microphone signal. IC5a is a flip flop, who´s output is logic "0" (0v) or logic "1" (15v) depending on its input signals. When the output is 0v, the microphone signal is switched "off" from the pre-amplifier to the audio line. When the output is 15v, the microphone signal via the pre-amplifier will be switched to the audio line.

The priority and disable request line are via a comparator circuit, connected to the reset and data input. The priority signal, when active, ensures that the flip flop will be reset, and the active disable request signal ensures that the data input becomes "0". The microphone call signal, from the microphone button, is via inverter circuit around IC7, applied to the clock input of IC5, and the microphone remote call signal to the set input. The clock or set pulse can make the flip flop output logic "1" (15v), causing the microphone to be switched "on".

The audio comparator output, is connected via a comparator to the reset input of IC5. Therefore after the delay time of approximately 30 to 45 seconds, the flip flop will be reset, and the switched "on" microphone is then switched "off".

## Call Position

In the call position, the microphone switching circuit is activated, by the switching control circuit. The microphone signal is fed via the pre-amplifier and switched to the audio line.

During a call, the logic "0" from the pressed microphone call button is via IC7 and associated circuitry inverted and applied as a "1" (15v) to the clock input of IC5.
No priority or remote signals are present,
therefore the reset input and the set input are at logic "0".
Because disable request is inactive, the data input of IC5 stays 15v, (logic "1"). The data input is high, and the output of the flip flop will be logic "1", (15v) on the positive edge of the clockpulse, caused by pressing the "call button". The inverse flip flop output is now "0", this output is fed back to the data input, which also becomes "0". This means that the next clockpulse (S1) will reset the flip flop. The 15v on output 1 is applied to the base of TS5 in the microphone switching circuit.
The transistor is conducting, causing TS4 also to conduct, current can now flow, via the emmitter of TS4 to ground. The microphone signal is taken from the collector. Because IC8a and IC8b are closed now, the microphone led illuminates.

## Pre-Amplifier

The pre-amplifier consists of IC1a, TS4 and associated components.
A DC voltage is fed via TS1 and applied to the electret microphone line. The current flowing from TS1 to the electret microphone, ensures that the "FET" inside the microphone is conducting. The analogue microphone signal, is applied to the microphone line, by the microphone itself, and fed via C1 and C2 to the + and - input of the operational amp. IC1a. C1 ensures that the DC voltage for the electret microphone, cannot reach the input of the Op amp.
A DC voltage of approximately 4v is fed via R5, and R6 and R8 to the analogue microphone signal on the inputs of IC1a. C2 ensures that this DC voltage is not influenced by TS2 and TS3. The output signal of the Op amp. IC1a if fed back via R11/C48 to the -input. With potentiometer R10 the amplification of IC1a can be adjusted according to the sensitivity of the used microphone.
In this way differences in sensitivity of the microphones are compensated.
The amplified signal, a DC level of approximately 10v on which the audio signal is superimposed, from the Op amp is applied to the base of TS4.

## Limiter

The limiter consists of TS2, TS3,and associated components. When the output signal of the Op amp IC1a reaches a value greater than ± 0.7v, D1 and D2 conduct, and so will TS2 or TS3. When either of these two transistors is conducting, the input signal from the pre-amplifier decreases. A sample of the current from the analogue microphone signal is then flowing via the conducting transistors to ground. The microphone signal is now limited.

The limiter is divided into two sections, the right section D2 and TS3 is for the positive AC part of the output signal, and the left section D1 and TS2, for the negative AC output signal.

## Resetting "Call" Position

If the call button S1 is pressed again, IC5 receives another positive pulse on its clock input. The inverse output pin 2, was "0", and so the data input of IC5. After the clockpluse, the output pin 1, becomes "0", because the data input is "0". Output 2 is the inverse of output 1, is logic "1", therefore the data input is "1" again. The logic "0" at output 1 causes the microphone switching circuit to become in-active. Transistor TS5 is not conducting, due to the 0v on its base, from the output of IC5. Therefore the microphone signal on the base of TS4, is not switched to the audio line.

## Priority

When the chairman wants priority over the delegate microphones the priority line becomes about 1,5V. Due R37 and R99 1V is applied to the -input of IC3a then.
Because the 6V on the +input the comperator output is about 15V which is logic "1". Via the reset input IC5 is now reset. The set input stays "0" and the data input "1". The flip flop output was "1", due to the reset the output becomes "0". The microphone signal is switched off by TS5 which is now nonconductive because of the 0V on its base.
As long as the priority line is 1,5V the reset input stays "1" and the flip flop resetted, pushing the call button does not influence the switching control circuit. The delegate can not switch on his microphone with his call button.

When the chairman resets his priority, the priority line becomes 27v, 27v is then fed to the -input of the comparator IC3a. Because the +input is 6v, the output is 0v, is logic "0", therefore the reset input to IC5 is no longer reset. Therefore the microphone can be switched on/of as normal via the call button.

## Disable Request

When the adjusted number of microphones, are switched "on" (1, 3 or 6 via switch S102) simultaneously. The disable request line reaches approximately 27v. This 27v is applied to the -input of IC2d.
Because the +input is connected to 10v the output of the comparator becomes 0v. The data input which is at 15v, is then brought down to approximately 1v, due to the forward voltage on the diode D13. This 1v is logic "0" to the flip flop. When the microphone is swiched "on", during the disable request, the data input is already at "0", because the inverse flip flop output is at 0v. During the disable request, the switched "on" microphones can be switched "off" by pressing the call button. The positive pulse on the clock input, clocks the data which is at "0", to the output.

During the disable request, a microphone cannot be switched "on", because the data input is set to "0". The call pulses from the call button, only switches a "0" to the flip flop output.

When the number of switched "on" microphones, is less than the maximum number, adjusted by switch S102, the disable request line becomes 0v.
The output from the comparator IC2d is now not longer clamping the date input to zero. The plug in unit is now in the listening position, and the delegate is now able to switch "on" his microphone, by pressing his call button.

## Audio Level Comparator

The audio level comparator ensures that when a delegate does not speak into his microphone for approximately 30 to 45 seconds, the flip flop IC5, fed via comparator IC3a, will be reset.

At input 3 of IC2a, a DC level of approximately 9v is applied. The microphone signal is applied to the -input 2 of IC2a. The Op. amp IC2a, subtracts the microphone signal from the DC level, and amplifies the resulting signal. The output signal is now at a 9v DC level, which is used to superimpose the amplified microphones signal on. This signal is then applied to the -input of IC2b and at input 5, the disable request signal. The disable request signal, plus a DC level from R20 on the disable request signal, together form a 9v DC level on which the audio signal (other delegates + delegate itself) is superimposed. IC2b subtracts the output of IC2a, which is the 9v on which the microphone signal is superimposed, from the 9v on which the microphone signal is superimposed. The output 7, of IC2b is at a DC level of 9v, on which the difference between the audio- and the microphone signal is superimposed. The difference voltage, can reduce the voltage on x, and the output of IC2a, which is the 9v on which the microphone signal is superimposed, can reduce the voltage on Y. When only the delegate is using his microphone, the audio signal is the same as the microphone signal. The Ac difference voltage at the output of IC2b is 0v, only the 9v DC level is on the output. The voltage on x is now 9v plus the forward voltage of D6, adding up to a total of approximately 10v.
When more than one delegate is speaking, the audio signal is higher than the microphone signal. On the output of IC2b, the difference voltage, superimposed on the 9v DC is applied, the negative going voltage of the AC difference signal, ensures that the 10v on x is decreased via D6 and C21.

If the delegate is silent, there is no microphone signal, therefore the AC voltage on the 9v DC level at the output of IC2a is at 0v. The voltage at Y is at 9v plus the forward voltage of D7, which in total sums up to approximately 10v. When the microphone is in use, the microphone signal is amplified by IC2a. The negative going voltage of this microphone signal ensures that the 10v on Y is decreased, via D7 and C22.

X is applied to the +input of IC2c, and Y to the -input. When X is greater than Y, the output of the Op amp is approximately 15v, and when Y is greater than X the output is 0v. Therefore when the delegate uses his microphone (he has to speak louder when others are using their microphone), the output of IC2a is 15v, C24 is now charged to 15v, because D9 is conducting. When the delegate stops using his microphone the output becomes 0v. Instantly C24 discharges via R35, and the DC level slowly decreases. This decreasing voltage is then fed via R36, and applied to the -input of IC3a. When the voltage becomes lower than approximately 7v, the comparator output, which was at 0v, now becomes 15v, and resets the flip flop IC5a, and the microphone will now be switched "off".

The time taken for C24 to discharge from 15v to approximately 7v is about 30 to 45 seconds. When the microphone is switched "off" the output of IC2c becomes 15v, independant of the number of other switched on microphones. This is because Y is approximately 1v, when the microphone is not switched "on". The 0v on the output of IC5a, is applied to D8, therefore C22 can only discharge until the voltage on Y reaches the forward voltage of D8, which is approximately 1v. This forward voltage cannot be exceeded, as long as 0v is applied to the cathode of D8. When the microphone is switched "on", by the delegate pressing his call button, then approximately 13v is applied to the cathode of diode D8. C22 can now partly discharge, and the voltage on Y increases to approximately 10v, because of the 9v DC on the cathode of D7 and its forward voltage of approximately 1v.

By placing the jumper S3, in the b-a position, capacitor C24 cannot discharge via R35, therefore the audio level comparator is in-active.
Switching S102, the audio level comparator can be made in-active. In the three position 1, 2 or 6 microphones in non-auto, the switch supplies 0v to the ground reference which is normally 9v DC.
This 0v is fed via R30 and C20, to the -input of IC2b and overrules the output signal from IC2a. The output of IC2b is now 0v, therefore X is at 10v. IC2c output, is and remains 15v, therefore the capacitor which is charged, discharges and the audio level comparator is in-active.

## 3. SPARE PARTS LIST

### Spare parts list of Microphone plug in Unit LBB 3302/00

| | Description | | | | | Code number |
|---|---|---|---|---|---|---|
| C 1 | 10 | NF | | | | 4822 122 32442 |
| C 2 | 100 | NF | 10% | X 7 R | 50 V | 5322 122 32839 |
| C 3 | 10 | UF | 20% | | 25 V | 4822 124 21747 |
| C 4 | 4,7 | UF | 20% | | 25 V | 5322 124 21966 |
| C 5 | 0,47 | UF | 20% | | 25 V | 4822 124 21453 |
| C 6 | 4,7 | UF | 20% | | 25 V | 5322 124 21966 |
| C 7 | 47 | UF | 20% | | 10 V | 5322 124 21975 |
| C 8 | 4,7 | UF | 20% | | 25 V | 5322 124 21966 |
| C 12 | 100 | PF | 5% | | 50 V | 4822 122 31765 |
| C 17 | 100 | NF | 10% | X 7 R | 50 V | 5322 122 32839 |
| C 18 | 82 | NF | 10% | | 50 V | 5322 122 32838 |
| C 20 | 10 | UF | 20% | | 25 V | 4822 124 21732 |
| C 21 | 4,7 | UF | 20% | | 25 V | 5322 124 21966 |
| C 22 | 4,7 | UF | 20% | | 25 V | 5322 124 21966 |
| C 23 | 100 | PF | 5% | | 50 V | 4822 122 31765 |
| C 24 | 100 | UF | 50% | | 25 V | 4822 124 20701 |
| C 25 | 100 | PF | 5% | | 50 V | 4822 122 31765 |
| C 26 | 4,7 | NF | 10% | X 7 R | 50 V | 4822 122 31784 |
| C 27 | 100 | NF | 10% | X 7 R | 50 V | 5322 122 32839 |
| C 28 | 10 | NF | | | | 4822 122 32442 |
| C 29 | 4,7 | NF | 10% | X 7 R | 50 V | 4822 122 31784 |
| C 30 | 100 | PF | 5% | | 50 V | 4822 122 31765 |
| C 31 | 100 | PF | 5% | | 50 V | 4822 122 31765 |
| C 32 | 47 | UF | 50% | | 25 V | 4822 124 20699 |
| C 33 | 47 | UF | 50% | | 40 V | 4822 124 20713 |
| C 35 | 22 | UF | 20% | | 25 V | 4822 124 21646 |
| C 36 | 47 | UF | 50% | | 25 V | 4822 124 20699 |
| C 41 | 56 | NF | 10% | | | 4822 122 32183 |
| C 43 | 22 | UF | 20% | | 25 V | 4822 124 21646 |
| C 45 | 100 | NF | 10% | X 7 R | 50 V | 5322 122 32839 |
| C 47 | 22 | NF | 10% | | 63 V | 4822 122 31797 |
| C 48 | 47 | PF | 5% | | 50 V | 4822 122 31772 |
| D 1 | BAV 70 | | | | | 5322 130 34331 |
| D 2 | BAV 70 | | | | | 5322 130 34331 |
| D 3 | BZX 84-C5V1 | | | | | 5322 130 32835 |
| D 6 | BAV 70 | | | | | 5322 130 34331 |
| D 7 | BAV 70 | | | | | 5322 130 34331 |
| D 8 | BAV 70 | | | | | 5322 130 34331 |
| D 9 | BAV 70 | | | | | 5322 130 34331 |

| | | | | | |
|---|---|---|---|---|---|
| D 11 | BZX 84-C15 | | | | 5322 130 33662 |
| D 12 | BAV 70 | | | | 5322 130 34331 |
| D 13 | BAV 70 | | | | 5322 130 34331 |
| D 15 | BAV 70 | | | | 5322 130 34331 |
| D 17 | BAV 70 | | | | 5322 130 34331 |
| D 19 | BZV 46- 2 VO | | | | 4822 130 31248 |
| D 20 | BZX 79- B30 | | | | 4822 130 34328 |
| D 21 | BZX 79- B6V2 | | | | 4822 130 34167 |
| IC 1 | LF 353 N | | | | 5322 209 81395 |
| IC 2 | LM 324 D | | | | 5322 209 83125 |
| IC 3 | LM 393 D | | | PHIN | 5322 209 71599 |
| IC 4 | LM 393 D | | | PHIN | 5322 209 71599 |
| IC 5 | HEF 4013 BT | | | | 5322 209 14477 |
| IC 7 | MC 1741 CD | | | | 5322 209 71597 |
| IC 8 | HEF 4066 BT | | | | 5322 209 14542 |
| R 1 | 5 K 6 | 2% | | 0,125 W | 4822 111 90572 |
| R 2 | 47 K | 2% | | 0,125 W | 4822 111 90543 |
| R 3 | 390 E | 2% | | 0,125 W | 5322 111 90138 |
| R 4 | 10 K | 2% | | 0,125 W | 4822 111 90249 |
| R 5 | 47 K | 2% | | 0,125 W | 4822 111 90543 |
| R 6 | 33 K | 2% | | 0,125 W | 5322 111 90267 |
| R 7 | 1 K | 2% | | 0,125 W | 5322 111 90092 |
| R 8 | 220 K | 2% | | 0,125 W | 4822 111 90197 |
| R 9 | 1 K 2 | 2% | | 0,125 W | 5311 111 90096 |
| R 10 | 4 K 7 | 10% | LIN | 0,5 W | 5322 101 10691 |
| R 11 | 68 K | 2% | | 0,125 W | 4822 111 90202 |
| R 12 | 100 K | 2% | | 0,125 W | 4822 111 90214 |
| R 13 | 10 K | 2% | | 0,125 W | 4822 111 90249 |
| R 15 | 100 K | 2% | | 0,125 W | 4822 111 90214 |
| R 16 | 1 K 5 | 2% | | 0,125 W | 4822 111 90151 |
| R 17 | 12 K | 2% | | 0,125 W | 4822 111 90253 |
| R 18 | 1 M | 5% | | 0,125 W | 5322 111 90094 |
| R 21 | 100 E | 2% | | 0,125 W | 5322 111 90091 |
| R 22 | JUMPER OE | | | | 4822 111 90163 |
| R 26 | 18 K | 2% | | 0,125 W | 4922 111 90238 |
| R 27 | 39 K | 2% | | 0,125 W | 5322 111 90108 |
| R 28 | 100 K | 2% | | 0,125 W | 4822 111 90214 |
| R 29 | 33 K | 2% | | 0,125 W | 5322 111 90267 |
| R 30 | 1 K | 2% | | 0,125 W | 5322 111 90092 |
| R 31 | 18 K | 2% | | 0,125 W | 4822 111 90238 |
| R 32 | 1 M | 5% | | 0,125 W | 5322 111 90094 |
| R 33 | 1 M | 5% | | 0,125 W | 5322 111 90094 |
| R 34 | 1 K | 2% | | 0,125 W | 5322 111 90092 |
| R 35 | 4 K 7 | 2% | | 0,125 W | 5322 111 90111 |
| R 36 | 100 K | 2% | | 0,125 W | 4822 111 90214 |

|  |  |  |  |  |
|---|---|---|---|---|
| R 37 | 1 M | 5% | 0,125 W | 5322 111 90094 |
| R 38 | 10 M | 5% | 0,125 W | 5322 111 91141 |
| R 39 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 40 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 41 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 42 | 1 K | 2% | 0,125 W | 5322 111 90092 |
| R 43 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 44 | 1 M | 5% | 0,125 W | 5322 111 90094 |
| R 45 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 46 | 47 K | 2% | 0,125 W | 4822 111 90543 |
| R 47 | 1 K | 2% | 0,125 W | 5322 111 90092 |
| R 48 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 49 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 50 | 27 K | 2% | 0,125 W | 4822 111 90542 |
| R 51 | 68 K | 2 % | 0,125 W | 4822 111 90202 |
| R 52 | 33 K | 2% | 0,125 W | 5322 111 90267 |
| R 53 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 54 |  |  |  | 5322 116 44008 |
| R 55 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 56 | 15 K | 2% | 0,125 W | 4822 111 90196 |
| R 57 | 15 K | 2% | 0,125 W | 4822 111 90196 |
| R 58 | 12 K | 2% | 0,125 W | 4822 111 90253 |
| R 59 | 2 K 7 | 2% | 0,125 W | 4822 111 90569 |
| R 60 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 73 | 33 K | 2% | 0,125 W | 5322 111 90267 |
| R 74 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 76 | 100 E | 2% | 0,125 W | 5322 111 90091 |
| R 77 | 100 E | 2% | 0,125 W | 5322 111 90091 |
| R 78 | 3 K 9 | 2% | 0,125 W | 4822 111 90571 |
| R 79 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 81 | 220 K | 2% | 0,125 W | 4822 111 90197 |
| R 82 | 3 K 9 | 2% | 0,125 W | 4822 111 90571 |
| R 83 | 3 K 9 | 2% | 0,125 W | 4822 111 90571 |
| R 84 | JUMPER OE |  |  | 4822 111 90163 |
| R 85 | JUMPER OE |  |  | 4822 111 90163 |
| R 86 | 220 K | 2% | 0,125 W | 4822 111 90197 |
| R 88 | 1 M | 2% | 0,125 W | 5322 111 90094 |
| R 92 | 82 K | 2% | 0,125 W | 4822 111 90575 |
| R 93 | 68 K | 2% | 0,125 W | 4822 111 90202 |
| R 94 | 680 E | 2% | 0,125 W | 4822 111 90162 |
| R 95 | 100 K | 2% | 0,125 W | 4822 111 90214 |
| R 96 | 5 K 6 | 2% | 0,125 W | 4822 111 90572 |
| R 97 | JUMPER OE |  |  | 4822 111 90163 |
| R 99 | 10 K | 2% | 0,125 W | 4822 111 90249 |
| R102 | 1 M | 5% | 0,125 W | 5322 111 90094 |

|  |  |  |  |  |
|---|---|---|---|---|
| R103 | 1 M | 5% | 0,125 W | 5322 111 90094 |
| R104 | 15 K | 1% | 0,6 W | 4822 116 53083 |
| S 3 | Pins for S3 |  |  | 5322 535 84341 |
| S 3 | Jumper S3 |  |  | 5322 290 60298 |
| TS 1 | BC 847 C |  | PHIN | 5322 130 42755 |
| TS 2 | BC 857 C |  | PHIN | 5322 130 42756 |
| TS 3 | BC 847 C |  | PHIN | 5322 130 42755 |
| TS 4 | BC 847 C |  | PHIN | 5322 130 42755 |
| TS 5 | BC 847 C |  | PHIN | 5322 130 42755 |
| TS 8 | BC 817-40 |  |  | 4822 130 42615 |
| TS 9 | BC 817-40 |  |  | 4822 130 42615 |
| X 7 | Microphone connector |  |  | 5322 265 40345 |

## Spare parts list for microphone assembly

|  |  |  |  |  |
|---|---|---|---|---|
|  | Microphone |  |  | 5322 242 20094 |
|  | Cap for microphone |  |  | 5322 462 50331 |
|  | Foam cap for microphone |  |  | 5322 462 40731 |
|  | Mic. cable |  |  | 5322 321 21078 |
|  | Knob for microphone push button |  |  | 5322 414 30086 |
| C 4 | 100 PF microphone | 5% | 50 V for | 4822 122 31765 |
|  | Mic. switch mechanism |  |  | 5322 276 11415 |
| C 1 | 1,5 UF | 20% | 35 V | 5322 124 14078 |
| C 2 | 10 UF | 50% | 40 V | 4822 124 20708 |
| C 3 | 10 UF | 50% | 40 V | 4822 124 20708 |
| D 1 | CQW 54 |  |  | 4822 130 32069 |
| D 2 | TIUG 164 |  |  | 5322 130 32587 |

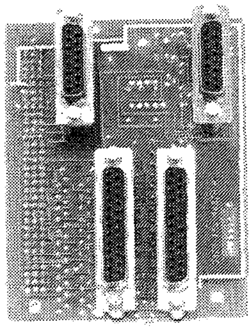
## Recommended spare parts list Microphone plug in Unit LBB 3302/00

| | Description | | Code Number |
|---|---|---|---|
| D 3 | BZX 84-C5V1 | | 5322 130 32835 |
| D 11 | BZX 84-C15 | | 5322 130 33662 |
| D 19 | BZV 46-x VO | | 4822 130 31248 |
| D 20 | BZX 79-B30 | | 4822 130 34328 |
| D 21 | BZX 79-B6V2 | | 4822 130 34167 |
| IC 1 | LF 353 N | | 5322 209 81395 |
| IC 2 | LM 324 D | | 5322 209 83125 |
| IC 3 | LM 393 D | PHIN | 5322 209 70225 |
| IC 4 | LM 393 D | PHIN | 5322 209 70225 |
| IC 5 | HEF 4013 BT | | 5322 209 14477 |
| IC 7 | MC 1741 CD | | 5322 209 11311 |
| IC 8 | HEF 4066 BT | | 5322 209 14542 |
| TS 1 | BC 847 C | PHIN | 5322 130 42755 |
| TS 2 | BC 857 C | PHIN | 5322 130 42756 |
| TS 3 | BC 847 C | PHIN | 5322 130 42755 |
| TS 4 | BC 847 C | PHIN | 5322 130 42755 |
| TS 5 | BC 847 C | PHIN | 5322 130 42755 |
| TS 8 | BC 817-40 | | 4822 130 42615 |
| TS 9 | BC 817-40 | | 4822 130 42615 |
| X 7 | Microphone connector | | 5322 265 40345 |

## Spare parts list for Microphone Assembly

| | Description | Code Number |
|---|---|---|
| | Microphone | 5322 242 20094 |
| | Cap for microphone | 5322 462 50331 |
| | Foam cap for microphone | 5322 462 40731 |
| | Mic. cable | 5322 321 21078 |
| | Knob for microphone push button | 5322 414 30086 |
| C 4 | 100 PF 5% 50 V for for microphone | 4822 122 31765 |
| | Mic. switch mechanism | 5322 276 11415 |
| D 1 | CQW 54 | 4822 130 32069 |
| D 2 | TIUG 164 | 5322 130 32587 |

LBB 3301/00 Interpreters + monitor
Distribution panel



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2. CIRCUIT DISTRIBUTION INT. + MON. DISTRIBUTION PANEL

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1. Block diagram int. + mon. distribution panel.
2. Circuit diagram int. + mon. distribution panel.
3. Location of components int. + mon. distribution panel.

## 1. INTRODUCTION

(see block diagram fig. 1)

The int. + mon. panel is a connection panel for the 6ch interpreters equipment on the one side and to the Monitor Distribution Board on the other hand. It connects the interpreters busbar and the floor signal to the M.D.B.
Channel 1 to 6 inclusive and floor from the M.D.B. are via this panel connected to the program selector output (distribution), and the audio from M.D.B. to the remote socket for monitoring via a loudspeaker. A "channel occupied" circuit provides information at the remote socket and at the transmitter socket. These 6 outputs can be used as an indication which channels are occupied.

## 2. CIRCUIT DESCRIPTION INT. + MON. PANEL

(see circuit diagram fig. 2)

On the panel, the feed from the power supply part a is applied to pin 4 and 5 on connector X203. This supply lines are distributed to the interpreters connector BU 207, to the M.D.B. connector X201 and finally via D201 and R205 to the monitor socket BU 210.

The power supply voltage is via the buffer circuit, which consists of TS201, R201, R202 and R203, applied to the resistor networks R223/R206/R207, etc. These networks provide for a DC level of approximately 18v on the floor, comm., ch1/ch6 and auto floor lines on the interpreters busbar.

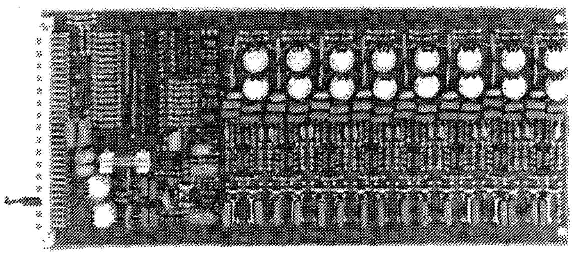
The asymetric audio line, coming from the connector panel, is applied to X203 pin 1 and 2 and via the seperation transformer T201 to the floor line on the panel.

The lines floor, ch1/ch6, comm. and auto floor from the interpreters busbar are applied to BU207 and directly connected with the M.D.B. via connector X201. To avoid that the D.C. levels on these lines via BU209 are applied to the transmitter, capacitors C202 to C217 are used. The amplified signals ch1/ch6 and floor, coming from the M.D.B., are via X201 connected to the distribution connector BU208.

The B.C.D. code for the Monitor part on the M.D.B. and the returning audio line are via X201 connected to the M.D.B. and via BU210 with the monitor equipment.

IC1 and IC2 ensure that 6 "channel occupied" information lines are provided to the transmitter connector BU 209 on the one side and to the monitor connector BU210. When a channel, e.g. ch1, is not occupied the D.C. voltage, provided by the int. mon. panel, is approximately 18v. In this case, the voltage on the -input of IC26 is larger then the voltage on the +input, ensuring that the comperator output is "0" (approx. 2,5v). When a microphone signal is switched to the channel, the D.C. voltage on the channel line becomes approximately 9v. The +input of the comperator IC26 is now larger (15v) then 9v on the -input. The output will be "1" which can be used as an indication that the channel is occupied.
This "1" is approx. 27v. A current of approx. 2.3 m.a. can be used to drive a L.E.D.

LBB 3203/00 Monitor Distribution Board (M.D.B.)



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## 1. INTRODUCTION
(see fig. 1)

The Monitor Distribution Board has 8 output channels, floor, auto floor, and channels 1 to 6 inclusive, which are amplified by symmetrical amplifiers (3 Watt). Only the floor and channels 1 to 6 are, fed to the programme selector socket BU 208. BCD code information is fed to the monitor selector on the MDB via the remote socket, enabling channels 1 to 6, floor, auto floor to be monitored. The audio line can be connected to a monitor loudspeaker and the communication signal from the interpreters´ desk is automatically fed to the monitor loudspeaker, independant of which channel is being monitored.

## 2. CIRCUIT DESCRIPTION OF MONITOR DISTRIBUTION BOARD

(see fig. 2)

The Monitor Distribution Board (MDB) provides the audio signal for the monitor loudspeaker. The desired channel for monitoring, can be selected by injecting its corresponding BCD code at the monitor socket BU 210. The channel selector switch, consisting of IC1 and IC2 is switched to the choosen channel via opto couplers, IC5 to IC8 and the schmitt-trigger IC4.
The BCD code controls the analoge multiplexers IC1 and IC2, this control line ensures that the selected channel of the interpreters´ bus bar is switched to the loudspeaker via the monitor socket. Channels 1 to 6, floor and auto floor are fed to amplifiers IC101 to IC 801, and amplified to the 12 Volts output level. Channels 1 to 6 and floor only, are connected to the distribution socket for the programme selectors. The output of the amplifiers IC101 to IC801 are also fed via a resistor divider network (R18/R2, etc.) to the analoge multiplexers IC1 and IC2, which switch the selected channel, due to the BCD code fed to IC3a and IC3b.

The amplifier stage IC3, TS1 to TS4, applies the selected channel to the connector X201. Because the communication line is automatically injected into the amplifier, the signal will override the selected channel. The microphone signal from an interpreters´ desk is switched to the communication channel, when the "COMM" button on the desk is pressed.

## 3. SPARE PARTS LIST

### Spare parts list of Monitor Distribution Board (M.D.B.) LBB 3203/00

| | Description | Code number |
|---|---|---|
| X 1 | P.C. male connector 2 x 32P | 5322 265 64104 |
| C 8 | 470NF 20 % 35 V | 5322 124 10319 |
| C 12 | 100UF 20 % 35 V | 5322 124 21389 |
| C 13 | 100UF 20 % 35 V | 5322 124 21389 |
| C 14 | 6,8UF 20 % 25 V | 5322 124 14081 |
| C 15 | 6,8UF 20 % 25 V | 5322 124 14081 |
| C 16 | 6,8UF 20 % 25 V | 5322 124 14081 |
| C 17 | 6,8UF 20 % 25 V | 5322 124 14081 |
| C 109 | 100UF 20 % 35 V | 5322 124 21389 |
| C 110 | 100UF 20 % 35 V | 5322 124 21389 |
| C 111 | 470NF 20 % 35 V | 5322 124 10319 |
| C 209 | 100UF 20 % 35 V | 5322 124 21389 |
| C 210 | 100UF 20 % 35 V | 5322 124 21389 |
| C 211 | 470NF 20 % 35 V | 5322 124 10319 |
| C 309 | 100UF 20 % 35 V | 5322 124 21389 |
| C 310 | 100UF 20 % 35 V | 5322 124 21389 |
| C 311 | 470NF 20 % 35 V | 5322 124 10319 |
| C 409 | 100UF 20 % 35 V | 5322 124 21389 |
| C 410 | 100UF 20 % 35 V | 5322 124 21389 |
| C 411 | 470NF 20 % 35 V | 5322 124 10319 |
| C 509 | 100UF 20 % 35 V | 5322 124 21389 |
| C 510 | 100UF 20 % 35 V | 5322 124 21389 |
| C 511 | 470NF 20 % 35 V | 5322 124 10319 |
| C 609 | 100UF 20 % 35 V | 5322 124 21389 |
| C 610 | 100UF 20 % 35 V | 5322 124 21389 |
| C 611 | 470NF 20 % 35 V | 5322 124 10319 |
| C 709 | 100UF 20 % 35 V | 5322 124 21389 |
| C 710 | 100UF 20 % 35 V | 5322 124 21389 |
| C 711 | 470N 20 % 35 V | 5322 124 10319 |
| C 809 | 100UF 20 % 35 V | 5322 124 21389 |
| C 810 | 100UF 20 % 35 V | 5322 124 21389 |
| C 811 | 470NF 20 % 35 V | 5322 124 10319 |
| D 1 | BZX79-B16 | 4822 130 34268 |
| F 1 | 1 Amp T | 4822 253 30021 |
| IC 1 | HEF4051BD | 4822 209 10262 |
| IC 2 | HEF4051BD | 4822 209 10262 |
| IC 3 | NE5532FE | 5322 209 86234 |
| IC 4 | HEF40106BD | 4822 209 10318 |
| IC 5 | CNX36 | 5322 130 90097 |
| IC 6 | CNX36 | 5322 130 90097 |

| | Description | Code Number |
|---|---|---|
| IC 7 | CNX36 | 5322 130 90097 |
| IC 8 | CNX36 | 5322 130 90097 |
| IC 9 | NE5534N | 5322 209 86285 |
| IC 101 | NE5532FE | 5322 209 86234 |
| IC 201 | NE5532FE | 5322 209 86234 |
| IC 301 | NE5532FE | 5322 209 86234 |
| IC 401 | NE5532FE | 5322 209 86234 |
| IC 501 | NE5532FE | 5322 209 86234 |
| IC 601 | NE5532FE | 5322 209 86234 |
| IC 701 | NE5532FE | 5322 209 86234 |
| IC 801 | NE5532FE | 5322 209 86234 |
| R 17 | 9 x IK 2 % 0,125 W | 5322 111 90256 |
| R 18 | 9 x IK 2 % 0,125 W | 5322 111 90256 |
| R 30 | PTC 5E6 60 V | 5322 116 40074 |
| R 31 | PTC 5E6 60 V | 5322 116 40074 |
| R 110 | PTC 5E6 60 V | 5322 116 40074 |
| R 111 | PTC 5E6 60 V | 5322 116 40074 |
| R 210 | PTC 5E6 60 V | 5322 116 40074 |
| R 211 | PTC 5E6 60 V | 5322 116 40074 |
| R 310 | PTC 5E6 60 V | 5322 116 40074 |
| R 311 | PTC 5E6 60 V | 5322 116 40074 |
| R 410 | PTC 5E6 60 V | 5322 116 40074 |
| R 411 | PTC 5E6 60 V | 5322 116 40074 |
| R 510 | PTC 5E6 60 V | 5322 116 40074 |
| R 511 | PTC 5E6 60 V | 5322 116 40074 |
| R 610 | PTC 5E6 60 V | 5322 116 40074 |
| R 611 | PTC 5E6 60 V | 5322 116 40074 |
| R 710 | PTC 5E6 60 V | 5322 116 40074 |
| R 711 | PTC 5E6 60 V | 5322 116 40074 |
| R 810 | PTC 5E6 60 V | 5322 116 40074 |
| R 811 | PTC 5E6 60 V | 5322 116 40074 |
| TS 1 | BD237 | 4822 130 44235 |
| TS 2 | BD238 | 4822 130 40917 |
| TS 3 | BD237 | 4822 130 44235 |
| TS 4 | BD238 | 4822 130 40917 |
| TS 5 | BC547C | 4822 130 44503 |
| TS 6 | BC557 | 4822 130 44256 |
| TS 101 | BD237 | 4822 130 44235 |
| TS 102 | BD238 | 4822 130 40917 |
| TS 103 | BD237 | 4822 130 44235 |
| TS 104 | BD238 | 4822 130 40917 |
| TS 201 | BD237 | 4822 130 44235 |
| TS 202 | BD238 | 4822 130 40917 |
| TS 203 | BD237 | 4822 130 44235 |
| TS 204 | BD238 | 4822 130 40917 |

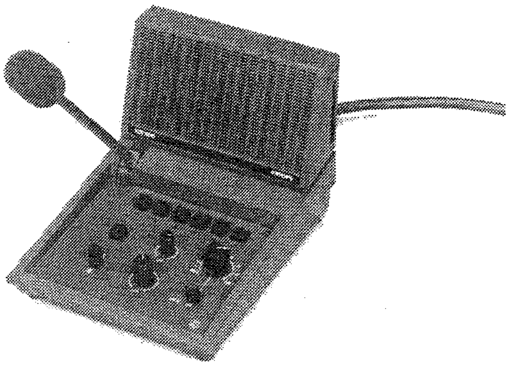
| | Description | Code Number |
|---|---|---|
| TS 301 | BD237 | 4822 130 44235 |
| TS 302 | BD238 | 4822 130 40917 |
| TS 303 | BD237 | 4822 130 44235 |
| TS 304 | BD238 | 4822 130 40917 |
| TS 401 | BD237 | 4822 130 44235 |
| TS 402 | BD238 | 4822 130 40917 |
| TS 403 | BD237 | 4822 130 44235 |
| TS 404 | BD238 | 4822 130 40917 |
| TS 501 | BD237 | 4822 130 44235 |
| TS 502 | BD238 | 4822 130 40917 |
| TS 503 | BD237 | 4822 130 44235 |
| TS 504 | BD238 | 4822 130 40917 |
| TS 601 | BD237 | 4822 130 44235 |
| TS 602 | BD238 | 4822 130 40917 |
| TS 603 | BD237 | 4822 130 44235 |
| TS 604 | BD238 | 4822 130 40917 |
| TS 701 | BD237 | 4822 130 44235 |
| TS 702 | BD238 | 4822 130 40917 |
| TS 703 | BD237 | 4822 130 44235 |
| TS 704 | BD238 | 4822 130 40917 |
| TS 801 | BD237 | 4822 130 44235 |
| TS 802 | BD238 | 4822 130 40917 |
| TS 803 | BD237 | 4822 130 44235 |
| TS 804 | BD238 | 4822 130 40917 |

Recommended spare parts list Monitor Distribution Board M.D.B. LBB 3203/00

| | Description | Code Number |
|---|---|---|
| X 1 | P.C. male connector 2 x 32p | 5322 265 64104 |
| D 1 | BZX79-B16 | 4822 130 34268 |
| IC 1 | HEF4051BD | 4822 209 10262 |
| IC 2 | HEF4051BD | 4822 209 10262 |
| IC 3 | NE5532FE | 5322 209 86234 |
| IC 4 | HEF40106BD | 4822 209 10318 |
| IC 5 | CNX36 | 5322 130 90097 |
| IC 6 | CNX36 | 5322 130 90097 |
| IC 7 | CNX36 | 5322 130 90097 |
| IC 8 | CNX36 | 5322 130 90097 |
| IC 9 | NE5534N | 5322 209 86285 |
| IC 101 | NE5532FE | 5322 209 86234 |
| IC 201 | NE5532FE | 5322 209 86234 |
| IC 301 | NE5532FE | 5322 209 86234 |
| IC 401 | NE5532FE | 5322 209 86234 |
| IC 501 | NE5532FE | 5322 209 86234 |
| IC 601 | NE5532FE | 5322 209 86234 |
| IC 701 | NE5532FE | 5322 209 86234 |
| IC 801 | NE5532FE | 5322 209 86234 |
| R 811 | PTC 5E6 60 V | 5322 116 40074 |
| TS 1 | BD237 | 4822 130 44235 |
| TS 2 | BD 238 | 4822 130 40917 |
| TS 3 | BD 237 | 4822 130 44235 |
| TS 4 | BD238 | 4822 130 40917 |
| TS 5 | BC547C | 4822 130 44503 |
| TS 6 | BC557 | 4822 130 44256 |
| TS 101 | BD 237 | 4822 130 44235 |
| TS 102 | BD 238 | 4822 130 40917 |
| TS 103 | BD 237 | 4822 130 44235 |
| TS 104 | BD 238 | 4822 130 40917 |
| TS 201 | BD 237 | 4822 130 44235 |
| TS 202 | BD 238 | 4822 130 40917 |
| TS 203 | BD 237 | 4822 130 44235 |
| TS 204 | BD 238 | 4822 130 40917 |
| TS 301 | BD 237 | 4822 130 44235 |
| TS 302 | BD 238 | 4822 130 40917 |
| TS 303 | BD 237 | 4822 130 44235 |
| TS 304 | BD 238 | 4822 130 40917 |
| TS 401 | BD 237 | 4822 130 44235 |

|  |  |  |
|---|---|---|
| TS 402 | BD 238 | 4822 130 40917 |
| TS 403 | BD 237 | 4822 130 44235 |
| TS 404 | BD 238 | 4822 130 40917 |
| TS 501 | BD 237 | 4822 130 44235 |
| TS 502 | BD 238 | 4822 130 40917 |
| TS 503 | BD 237 | 4822 130 44235 |
| TS 504 | BD 238 | 4822 130 40917 |
| TS 601 | BD 237 | 4822 130 44235 |
| TS 602 | BD 238 | 4822 130 40917 |
| TS 603 | BD 237 | 4822 130 44235 |
| TS 604 | BD 238 | 4822 130 40917 |
| TS 701 | BD 237 | 4822 130 44235 |
| TS 702 | BD 238 | 4822 130 40917 |
| TS 703 | BD 237 | 4822 130 44235 |
| TS 704 | BD 238 | 4822 130 40917 |
| TS 801 | BD 237 | 4822 130 44235 |
| TS 802 | BD 238 | 4822 130 40917 |
| TS 803 | BD 237 | 4822 130 44235 |
| TS 804 | BD 238 | 4822 130 40917 |

**LBB 3221/00 6 Channel Interpreter's Desk**



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2. CIRCUIT DESCRIPTION 6 CHANNEL INTERPRETER´S DESK

3. SPARE PARTS LIST

Figures:

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2a Circuit diagram 6 channel interpreter´s desk
2b " " " " "
3. Location of components 6 channel interpreter´s desk
4. Level diagram

## 1. INTRODUCTION

The 6 channel interpreter´s desk can be sub-divided into 4 sections: (See Fig. 1)

Section 1. Microphone signal amplifier section

Section 2. Monitor section for headphone or loudspeaker

Section 3. Channel selection section
The microphone signal or floor signal will be switched by this section to a choosen channel of the interpreter´s bus bar. The channel number is selected by means of switches S4 to S10.

Section 4. Audio sensing section
Controls the channel LED´s, MIC LED and the AFL LED.

## 2. CIRCUIT DESCRIPTION 6 CHANNEL INTERPRETER´S DESK

(See block diagram Fig. 1 and circuit diagram Fig. 2a and b)

The block diagram Fig. 1 divides the circuit diagram Fig. 2a and b into 4 sections.

### Section 1. Microphone section (IC1, 2, 7a, 12d, 13f, TS1, S2a, S1a and B1)

The microphone delivers a signal via pin 2 of X2 to the pre-amplifier IC1. The microphone receives a voltage of approximately 2 Volts via pin 1 of connector X2. The circuit TS1, D1, D2, D24, D25 and B1 are an automatic volume control A.V.C.
If the emitter voltage of TS1 falls below the reference voltage on the base of TS1 (via D24 or D25), then C3 is charged. C3 discharges through B1 as a result of which the amplification is restricted. In the case of fast peaks, C4 will discharge via B1. The microphone signal from the pre-amplifier IC1 is switched to the symmetrical amplifier IC2 by means of the microphone switch S1a or comm. switch S2a. When the microphone is off and none of the other interpreters´ desks use the choosen channel of this interpreter´s desk, then the floor signal (X1/X6 pin 1 and 14) will be connected via IC7a and b to the symmetrical amplifier IC2. IC7a and b are controlled by section 3 via IC12d. Section 3 senses whether the choosen channel of one desk is in use by other interpreters´ desks.

### Section 2. Monitoring section (IC5, 6, 14, 15, T1, S3, S11 and TS2 to TS5)

The analoge multiplexers IC5 and 6 are controlled by means of switch S11 or S3c and IC16a. By means of the FL/AFL switch S3c, a choice can be made between monitoring the channels by means of S11 or monitoring the AFL channel. If the selection is made for monitoring the channels by means of S11 (S3 is open), then IC16a is disabled and S11 directly controls the multiplexer IC5 and 6. D4, D5 and D6 ensure that in the last three positions of S11 the multiplexer IC5 and 6 switches the floor signal to the monitoring section.
If switch S3 is set at FL/AFL monitoring (S3 is closed), then IC16a is enabled. The autofloor information from IC12d pin 14 of section 4 is now used to control the multiplexer IC5 and 6 via IC16a. If the auto floor (AFL) channel is not used, then pin 14 of IC12d is high and therefore pins 7, 5 and 3 of IC16a are high. The multiplexer, IC5 and 6, is controlled by IC16a and IC6 switches the floor signal to the headphone via T1, IC14 and 15.
When auto floor is used, pin 14 of IC12d is low. The multiplexer IC5 then switches the AFL channel to the headphone via T1, IC14 and 15.
In the case where the interpreter provides auto floor, then pin 14 of IC12d stays high and IC5 switches the floor to the headphone via T1, IC14 and 15. The choosen symmetrical channel goes via T1 to the assymmetrical operational amplifier IC14. Volume control is achieved by R28. The frequency response is

boosted at 4 kHz by C12, R24, R35 and C13. R33 is used to obtain tone control around 4 kHz. A signal is presented to the headphone via operational amplifier IC15 and TS2 to TS5 (X5). The booth loudspeaker can be connected to this signal via X3 pins 1 and 2. Section 3 ensures that the booth loudspeaker can be switched "on" and "off" (X3-5).

Section 3. Channel selection (IC3, 4, 7c, 10, 13a, b, c, e, 16b, S1b, S2b, S4 to S10)

With the interlocking switches S5 to S10a, the channel can be choosen for the microphone signal. Via R49, a logic "1" is present on pin 11 of IC13a except when the comm. button S2 is closed. When the comm. button is not used, then pin 8 at IC13b is at a logic "1" and the priority encoder IC10 receives the channel information from S5a to S10a. The code on the control lines pin 6, 7 and 9 from IC10 corresponds to the choosen channel by S5a to S10a. The control lines ensure that the multiplexer IC3 and 4 switches the microphone signal on pin 13 and 3 to the right channel on the interpreters´ bus bar. When the comm. button is pressed, then pin 8 of IC13b is at a logic "0" S5a to S10a have no influence on IC10. All inputs of IC10 pin 1 to 3 and 10 to 13 are low except for pin 4, this is the combination for the comm. code. The control lines pin 6, 7 and 9 ensure that IC3 and 4 switch the microphone signal to the comm. channel. The purpose of R104 and R105 is to ensure that the d.c. signals on both sides of the switches IC3 and 4 are at the same magnitude (suppress transients).

Use of the AFL channel:
If, for example, via switch S4, channel 6 is selected then when the interpreter selects this channel by means of S10a, the microphone signal will be switched to the AFL channel via the analoge switch IC7c. The microphone signal is of course, also switched to channel 6 by IC3 and 4. The control lines of IC7c pins 12 and 6 come from switch S4. The purpose of R118 and R119 is to ensure that the d.c. signals on both sides of the switch IC7c are at the same magnitude. On all channels of the interpreters´ bus bar, a d.c. voltage of 2/3 VB 18V6 is present (VB= power supply of 28V) These d.c. voltages come from the Central Supply Unit (int. / mon. panel).

If an activated microphone is switched on a channel, then the d.c. level of this channel becomes 1/3 VB 9V3 via S1b, D19, R100 and R101. For the AFL channel this will happen via S1b, D20, R102 and R103. When the comm. channel is used the d.c. level of 1/3 VB becomes via S2b, D16, D19, R100 and R101. This difference between the d.c. levels is used by section 4 of all interpreters´ desks which detect these levels and switch on the LED´s of the engaged channels.
The difference of d.c. levels is also used for switching the floor signal to the unused channels. IC12a detects the d.c. level of the selected channel of the interpreter´s desk. When no other interpreter´s desk uses this selected channel then

the d.c. level of this channel is 2/3 VB 18V6. IC12a detects this in pin 2 and pin 1 becomes low. Via the inverter IC13f the analoge switch IC7a and b are enabled. The floor signal goes now via the symmetrical amplifier IC2 to the multiplexer IC3 and 4 which switches it to the selected channel.
The booth loudspeaker is switched on and off by the interpreter´s desk which is set to "master" by switch S12b.
Only when no interpreter´s desk in the same booth has a switched on microphone, does the "master" interpreter´s desk switch on the booth loudspeaker via X3 and 5.
When the microphone switch is in the off position then IC16b is enabled via IC13e and S1b. Pin 13 of IC16b becomes high (21V5) and switches the booth loudspeaker on only when the control line send loudspeaker off. From the slaves via X1 pin 23 are high. The loudspeaker can be switched off via D21 when the comm. button S2b is used. The on/off microphone information from pin 11 of IC16b is used by section 4.

Section 4. Audio sensing section (IC11, 12a, b, c, IC8, IC9, D7 to D15 and TS9)

IC11, IC12a, b and c detect if a channel is used or not. When for example channel 1 is selected on an other interpreter´s desk and its microphone is on then the d.c. voltage on the line is 1/3 VB 9V3 (via R100, R101, D19 and S1b/S2b of the other desk). The audio signal will be cancelled by R69 and R70 so on pin 5 of IC11a only the d.c. voltage of 1/3 VB = 9V3 is available. This d.c. voltage is lower than the 12V7 on pin 6 so that pin 7 becomes low and LED D7, will light because the switch IC8a is disabled. In the case where the interpreter´s desk provides channel 1, there will be, via S5b, 21V5 present on pin 5 of IC11a. Pin 5 is now higher then pin 6 and therefore pin 7 becomes high so that the analoge switch IC8a is closed and D7 will not be lit. The voltage of 21V5 on S5b comes from section 3 IC16b pin 11 when the interpreter´s microphone is switched on.
For the auto floor channel the same principle is used as for channel 1 to 6. IC12d ensures, via the switch IC19d, that the AFL LED lights or not. When one of the other interpreters uses the AFL channel, then a d.c. voltage of 1/3 VB = 9V3 is present on this channel. IC12d detects this and pin 14 becomes low and D14 lights up. In the case where the interpreter provides auto floor, there will be, from S4 of section 3, 21V5 present on pin 12 of IC12d via D23 and R83. Pin 14 of IC12d becomes high and the AFL LED will not light up. Pin 14 of IC12d is also used by IC16a section 2 for monitoring the floor or auto floor channel via the headphone.

## 3. SPARE PARTS LIST

Spare parts list of 6 channel interpreter´s desk LBB 3221/00

| | Description | Code number |
|---|---|---|
| | Rubber foot | 5322 462 40211 |
| | Knob for AFL selector S4 | 5322 414 30084 |
| | Cable and connector assembly X6 | 5322 321 21075 |
| | Cable relief grommet | 5322 325 64049 |
| | Flat spring for microphone handle | 5322 492 63142 |
| | Connector for microphone X2 | 5322 268 40278 |
| | Microphone capsule | 5322 242 20094 |
| C | 100 PF 100 V for capsule | 4822 122 31715 |
| | Protective cap for microphone | 5322 462 40728 |
| | Wind up for microphone | 5322 462 40731 |
| | Cap and microphone handle assembly | 5322 310 30601 |
| | Microphone assembly | 5322 310 30602 |
| | Knob for comm. switch S2 | 5322 414 30083 |
| | Tumbler knob for mic. switch S1 | 5322 414 30085 |
| | Knob for channel selector switch S11 | 5322 414 30082 |
| | Reducing bush for knob S11 | 5322 532 21041 |
| | Cap black for knob S11 and R 28 | 5322 414 70002 |
| | Knob for tone control R33 | 5322 414 30001 |
| | Cap black for knob R33 | 5322 414 70001 |
| | Knob for volume control R28 | 5322 414 30002 |
| X 1 | D Connector 25 P | 5322 267 60147 |
| X 2 | Pin contact | 5322 535 84341 |
| S 5 TO S 10 | Push switch | 5322 276 60227 |
| S 3 | Tumbler switch FL/AFL | 5322 277 10797 |
| S 1 | Tumbler microphone switch | 5322 277 10798 |
| S 12 | Slide switch L.S. | 5322 277 20986 |
| S 2 | Push switch | 5322 276 20339 |
| S 11 | Rotary switch 10 positions | 5322 273 30314 |
| S 4 | Rotary switch 7 positions | 5322 273 30313 |
| B 1 | 2F735 | 5322 130 34912 |
| C 2 | 4,7UF 50 % 63 V | 4822 124 20726 |
| C 3 | 1000UF 50 % 10 V | 4822 124 20768 |
| C 4 | 15UF 10 % 16 V | 4822 124 20977 |
| C 10 | 470NF 20 % 35 V | 5322 124 10319 |
| C 11 | 15UF 10 % 16 V | 4822 124 20977 |
| C 14 | 3,3UF 20 % 35 V | 5322 124 14067 |
| C 15 | 100UF 50 % 40 V | 4822 124 20715 |
| C 16 | 100UF 50 % 40 V | 4822 124 20715 |
| C 17 | 100UF 50 % 40 V | 4822 124 20715 |

| | Description | Code number |
|---|---|---|
| C 18 | 6,8UF 20 % 25 V | 5322 124 14081 |
| C 19 | 47UF 50 % 25 V | 4822 124 20699 |
| C 20 | 33UF 40 % 10 V | 4822 124 20945 |
| C 21 | 10UF 50 % 16 V | 5322 124 14066 |
| C 22 | 10UF 50 % 40 V | 4822 124 20708 |
| C 23 | 10UF 50 % 40 V | 4822 124 20708 |
| C 24 | 10UF 50 % 40 V | 4822 124 20708 |
| C 25 | 10UF 50 % 40 V | 4822 124 20708 |
| C 26 | 15PF 2 % 500 V | 4822 122 31197 |
| C 27 | 15PF 2 % 500 V | 4822 122 31197 |
| C 28 | 10UF 50 % 40 V | 4822 124 20708 |
| C 29 | 10UF 50 % 40 V | 4822 124 20708 |
| C 30 | 10UF 50 % 40 V | 4822 124 20708 |
| C 31 | 10UF 50 % 40 V | 4822 124 20708 |
| C 38 | 10UF 50 % 16 V | 5322 124 14066 |
| C 43 | 10UF 50 % 16 V | 5322 124 14066 |
| D 1 | BZX79-B8V2 | 4822 130 34382 |
| D 2 | BAW62 | 4822 130 30613 |
| D 3 | BZX79-B12 | 4822 130 34197 |
| D 4 | BAW62 | 4822 130 30613 |
| D 5 | BAW62 | 4822 130 30613 |
| D 6 | BAW62 | 4822 130 30613 |
| D 7 | CQW54 | 4822 130 32069 |
| D 8 | CQW54 | 4822 130 32069 |
| D 9 | CQW54 | 4822 130 32069 |
| D 10 | CQW54 | 4822 130 32069 |
| D 11 | CQW54 | 4822 130 32069 |
| D 12 | CQW54 | 4822 130 32069 |
| D 13 | CQW54 | 4822 130 32069 |
| D 14 | TIUG164 | 5322 130 32587 |
| D 15 | BZV46-1V5 | 5322 130 34865 |
| D 16 | BAW62 | 4822 130 30613 |
| D 17 | BZX79-B16 | 4822 130 34268 |
| D 19 | BAW62 | 4822 130 30613 |
| D 20 | BAW62 | 4822 130 30613 |
| D 21 | BAW62 | 4822 130 30613 |
| D 22 | BAW62 | 4822 130 30613 |
| D 23 | BAW62 | 4822 130 30613 |
| D 24 | BAW62 | 4822 130 30613 |
| D 25 | BAW62 | 4822 130 30613 |
| IC 1 | TDB0156DP | 5322 209 82804 |
| IC 2 | NE5532FE | 5322 209 86234 |
| IC 3 | HEF4052BD | 4822 209 10263 |
| IC 4 | HEF4052BD | 4822 209 10263 |

|  | Description | Code number |
|---|---|---|
| IC 5 | HEF4052BD | 4822 209 10263 |
| IC 6 | HEF4052BD | 4822 209 10263 |
| IC 7 | HEF4066BP | 5322 209 14104 |
| IC 8 | HEF4066BP | 5322 209 14104 |
| IC 9 | HEF4066BP | 5322 209 14104 |
| IC 10 | HEF4532BD | 4822 209 10278 |
| IC 11 | LM324N | 4822 209 80587 |
| IC 12 | LM324N | 4822 209 80587 |
| IC 13 | HEF40106BD | 4822 209 10318 |
| IC 14 | TDB0156DP | 5322 209 82804 |
| IC 15 | NE5532FE | 5322 209 86234 |
| IC 16 | HEF40097BD | 4822 209 10317 |
| R 4 | Pot.meter 2K2 0,5 W | 5322 101 14008 |
| R 28 | Carb. pot. 22K | 5322 101 20799 |
| R 33 | Carb. pot 2K2 | 5322 101 20798 |
| R 52 | 9 X 100K | 5322 111 90599 |
| R 109 | PTC 5E6 60 V | 5322 116 40074 |
| T 1 | Transformer | 5322 140 60264 |
| TS 1 | BC547C | 4822 130 44503 |
| TS 2 | BC639 | 4822 130 41053 |
| TS 3 | BC640 | 4822 130 41078 |
| TS 4 | BC639 | 4822 130 41053 |
| TS 5 | BC640 | 4822 130 41078 |
| TS 6 | BC547C | 4822 130 44503 |
| TS 7 | BC557B | 4822 130 44568 |
| TS 8 | BC557B | 4822 130 44568 |
| TS 9 | BC547C | 4822 130 44503 |
| TS 10 | BC547C | 4822 130 44503 |
| X 4 | Micr. jack | 5322 267 30609 |
| X 5 | Headphone jack | 5322 267 30522 |

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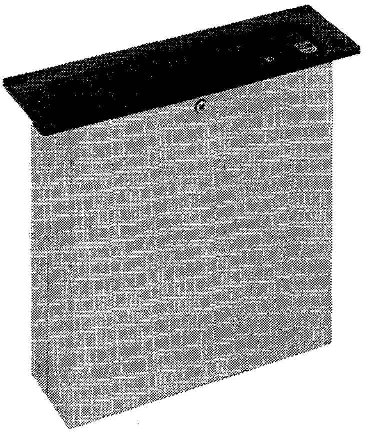
## LBB 3360/20 FLUSH MOUNTING DELEGATE'S UNIT



## 1. INTRODUCTION DELEGATE'S UNIT

The delegate's unit can be divided into 4 parts:

| | |
|---|---|
| Part 1 | Microphone amplifier<br>Amplifies and limits the microphone input signal. |
| Part 2 | Audio amplifier<br>Amplifies the audio signal, and distributes it to the loudspeaker connection. |
| Part 3 | Audio switch off circuit<br>Compares the audio signal, and the microphone signal. Automatically switches "off" the microphone, when there is no input from the delegate's unit for approximately 30 to 45 seconds. |
| Part 4 | Microphone and loudspeaker switching circuit<br>Switches the microphone and loudspeaker on or off, depending on the status of the control signals. The control signals comprise of the microphone, remote, priority and disable request signals, plus the output signal from the auto switch off circuit. |

## 2. CIRCUIT DESCRIPTION DELEGATE'S UNIT

(see circuit diagram)

When the system is switched "on", capacitor C33 charges to the supply voltage 27V. Resistors R48, and R50 causes the voltage on the + input 5 of IC3b to be lower than on the negative input 6. This state is valid until the power supply voltage reaches 18V. The difference negative voltage, between the negative input and the positive input of IC3, causes the comparator output to be 0V. This 0V is fed to the negative input 2 of IC3a, because the voltage on the positive input 3 is +6V, the comparator output will be high i.e. logic "1". Logic "1" resets the flip-flop IC5a. When switching on the system, if the supply voltage exeeds 15V, the zener diode D11 will conduct, causing the voltage at input 6, to remain at a constant level of 15V. If the power supply voltage exeeds 18V, the voltage at the input of IC3b pin 5, is higher than the 15V on input 6 causing a positive difference voltage, ensuring that the comparator no longer clamps the voltage to zero. 15V is applied to the negative input of IC3a, pin2, which is higher than the +6V on the positive input 3, therefore the output from the comparator is 0V (logic "0"). Logic "0" will no longer reset the flip-flop IC5, and the delegate unit is now ready for use.

### Switching Control Circuit General

The switching control circuit IC5a, IC2d, IC3a,and IC4a/b carries out all the switching functions in the delegate unit. Switching is due to the state of the call microphone signal, priority, disable request and remote control lines, the microphone signal or the audio signal to the loudspeaker. IC5a is a flip-flop, who's output is logic "0" (0V) or logic "1" (15V) depending on its input signals. When the output is 0V, the microphone is switched "off" from the pre-amplifier to the audio line. When the output is 15V, the microphone signal via the pre-amplifier, will be switched to the audio line and the loudspeaker is switched "off".

The priority and disable request lines are via a comparator circuit connected to the reset and data input. The priority signal, when active, ensures that the flip-flop will be reset and the active disable request signal ensures that the data input becomes "0". The microphone call signal, from the microphone button, is applied to the clock input of IC5, and the remote call signal to the set input. The clock or set pulse can make the flip-flop output logic "1", causing the microphone to be switched "on" and the loudspeaker "off".

The audio comparator output, is connected via a comparator to the reset input of IC5. Therefore after the delay time of approximately 30 to 45 seconds, the flip-flop will be reset, and the switched "on" microphone is switched "off".

## Listening

In the listening position, the switching control circuit, switches via the loudspeaker switching circuit the audio signal to the audio amplifier and to the loudspeaker. The microphone signal is disconnected from the line via the microphone switching circuit. During listening the clock input of IC5 is "low" because the call button has not been pressed. Because there is no priority, the priority line is at 27V. The voltage on the negative input 2 of IC3a, via D9, R34 and R36 is approximately 12V. Because the positive input is +6V, the compatator output is 0V. This 0V is applied to the reset input of IC5. The disable request, connected to pin 13 of IC2d is inactive, therefore the negative input is approximately 0V. The positive input to IC2d pin 12 is +10V therefore the comparator does not clamp the data input of IC5 to "low". At last there is no remote control, meaning that the remote line which is connected to the set input of IC5 is 0V and does not set the flip-flop.
The output of the flip-flop, which is at 0V, is connected via a resistor and capacitor network, to transistor TS5. This circuit forms the microphone switching circuit. 0V on the base of TS5 causes it to not conduct, therefore TS4 which is a part of the pre-amplifier is also non-conductive. The microphone signal on the base of TS4 therefore does not reach the audio line, and acts as if it were switched "off"
The loudspeaker switching circuit, consists of an external NPN transistor and a relay. The output of IC5 switches via the transistor the relay which has a break contact in serial with the loudspeaker.

## Audio amplifier

The amplifier consists of IC1b, TS6, TS7 and associated components. The audio signal from the audio line is fed via C9 and R19 to the positive input of IC1b, the ground reference is fed to the negative input. The operational amplifier, amplifies the line signal. The output is a DC level of approximately 14 Volts on which the audio signal is superimposed. The balanced output stage TS7 and TS6 provide the current for driving a low impedance speaker.

### Call position

In the call position, the microphone switching circuit is activated, by the switching control circuit. The microphone signal is fed via the Pre-amplifier and switched to the audio line. The loudspeaker is fed via the loudspeaker switching circuit, and switched "off" from the audio amplifier.

During a call, the clock input of IC5 is logic "1" because the call button is pressed. No priority or remote signals are present, therefore the reset input and the set input are at logic "0". Because disable request is inactive, the data input of IC5 stays "1". On the positive edge of the clock input, caused by the call button, this "1" will be clocked to the output. The inverse output will now be "0" and is fed back to the data input. This means that when the next clock pulse occurs, the output will go "low" again. The "1" on the output of the flip-flop is fed to the base of TS5 in the microphone switching circuit, causing it to conduct, whereby TS4 also will be conductive. Current can now flow via the emitter of TS4 to earth and LED D4 illuminates. The microphone signal is taken from the collector of TS4 and fed to the line.

### Pre-amplifier

The pre-amplifier consists of IC1a, TS4 and associated components. A DC voltage is fed via TS1 and applied to the electret microphone line. The current flowing from TS1 to the electret microphone, ensures that the FET inside the microphone is conducting. The analogue microphone signal is applied by the microphone to the microphone line and fed via C1 and C2 to the + and - inputs of operational amplifier IC1a. C1 ensures that the DC voltage for the electret microphone, cannot reach the op-amp. A DC voltage of approximately 4V is fed via R5, R6 and R8 to the microphone signal on the inputs of IC1a. C2 ensures that this DC voltage is not influenced by TS2 and TS3. The output of the op-amp IC1a is fed back via R11/C48 to the - input and via the resistor between X2-5 and X2-6. The resistance value is dependant on the sensitivity of the electret microphone. In this way differences in sensitivity of the microphones are compensated. The amplified signal, a DC level of approximately 10V on which the audio signal is superimposed, is applied to the base of TS4.

### Limiter

The limiter consists of TS2, TS3 and associated components. When the AC output signal of the op-amp IC1a reaches a value greater than 1.4V, D1 or D2 will conduct and so will TS2 or TS3. When either one of these transistors is conducting, the input signal to the pre-amplifier decreases. A sample of the current from the microphone flows via the conducting transistor to ground and the signal is limited.
The limiter is divided into two sections, the right section D2 and TS3 for the positive AC and the left section D1 and TS2 for the negative AC of the microphone signal.

### Resetting "call" position

If the call button S1 is pressed again, IC5 receives another positive pulse on its clock input. The inverse output pin 2 was "low", and so is the data input of the flip-flop. After the clock-pulse the "0" will appear on the output, therefore the inverse output will go "high" and so will the data input. This "low" output disables the microphone signal and enables the connected speaker.

### Priority

When the chairman requires priority over the delegate microphones, the priority line is at about 1.5V. Due to R37 and R99 1V is applied to the - input of IC3a. Because of the 6V on the + input the comparator output is at about 15V, which is logic "1". Via the reset input IC5 is now reset. The set input remains at "0" and the data input becomes "1". The flip-flop output was "1" but will now go "low" and the microphone signal is switched off. As long as the priority line stays on 1.5V the reset input of IC5 stays "high" and clock pulses from the call button will have no influence on the flip-flop and the microphone remains switched off.

### Disable request

When the adjusted number of microphones are switched on simultaneously, the disable request line reaches approximately 27V. This 27V is applied to the - input of IC2d. Because the + input is at +10V the output of the comparator becomes 0V. The data input which is on +15V is now clipped to 0.7V, which is logic "0" to the flip-flop. When the microphone is switched "on" this "0" will be clocked to the output, but because the output already was "low" the status of the delegate will not change. During the disable request the microphone can be switched off by pushing the call button.
When the number of switched "on" microphones is less than the maximum number, the disable request line becomes 0V. The output from the comparator IC2d is no longer clamping the data input to zero. The delegate unit is now in the listening mode and the delegate is able to switch "on" his microphone by pressing the call button.

**Remote control**

When a central control desk is included in the system, the call button can also be used as a microphone request button. This can only be achieved, when the control desk is in manual mode.

Three situations exist: 1 No central control deks connected.
2 Central control desk connected, and positioned in the auto mode.
3 Central control desk in the manual mode

When a central control desk is connected in the auto mode, the remote line is higher than 2/3V+. When no desk is connected resistor R38, which is connected to V+ (27V) ensures that the remote line is higher than 2/3V+. The remote line is fed via C29, and connected to the set input of the flip-flop. C29 ensures that the DC voltage is blocked, and the set input is "0". The delegate is able to switch "on" or "off" his microphone via the call button as usual. When the central control desk is in the manual mode, the voltage on the remote line is lower than 2/3V+. The flip-flop IC5a is not set due to capacitor C29. Because the - input is 2/3V+, the output is now 0V. When the delegate presses his call button, the output of IC5a becomes 15V, but is clamped behind R59 by IC4a and D10a which will illuminate. The 15V output of the flip-flop is also applied to the base of TS9, which causes it to conduct. Current now flows from the request line, this is a sign for the central control desk that a request has been made. The operator of the central control desk makes the remote line higher than 2/3V+, the output of the comparator IC4a then becomes 15V, and the voltage at R59 is no longer decreased, therefore the 15V is applied to the base of TS5. The microphone will be switched "on" and the loudspeaker "off".

The operator is also able to switch "on" a delegate microphone, even though the delegate has not requested it. The voltage on the remote line is now switched from a value much lower than 2/3V+, to a value greater than 2/3V+ (about V+). Because of the fast rise time and the high voltage step, this pulse passes through the differentiation network C29 and R45 and sets the flip-flop IC5 via the set input. The output of the flip-flop is now "high" and the microphone is switched "on".

The operator is able to switch "off" the microphone, by switching the voltage on the remote line from a value greater than 2/3V+, to a voltage much less than 2/3V+, via C26 to the - input of IC3a, which is 27V when there is no priority and is reduced to below 6V for a short moment during the voltage drop. This results in a reset pulse from IC3a being fed to the reset input of IC5a and the microphone is switched off.

When the central control desk is used, the priority line from the chairmans unit is not connected to the other delegate units, but to the central control desk. When a chairman presses his "priority button", two situations exist: the central control desk is in manual, or in auto mode.
In manual mode, the central control desk generates a DC level, which is greater than the 6V, but lower than the 2/3V+ (18V) on the priority line. This voltage is then fed to the + input of IC4b, ensuring that the comparator output is 0V. When the microphone is switched on, the voltage on the anode of D10 and resistor R59 is decreased and the microphone is switched off.
When the priority button is released by the chairman, the priority line becomes approximately 27V and the output of IC4b goes to 15V, therefore the voltage on the anode of D10 is no longer reduced and the microphone is switched on again. So when the control desk is in manual mode, priority from the chairman doesn't switch off the microphone but only mutes it.

In the "auto mode" the microphone is switched off when the chairman takes priority and remains off when the priority button is released again. In auto mode the central control desk generates a DC level lower than 6V on the priority line after a priority call. This voltage is then fed to the - input of IC3a and because the + input is at +6v, the comparator output is 15V and resets the flip-flop. When the priority is released, the priority line goes to 27V. The output of IC3a is now at 0V, and the flip-flop is no longer reset, the microphone remains switched off and the delegate unit is now in the listening position.

**Audio level comparator**

The audio level comparator ensures that when a delegate does not speak into his microphone for approximately 30 to 45 seconds, the flip-flop IC5 will be reset via comparator IC3a.

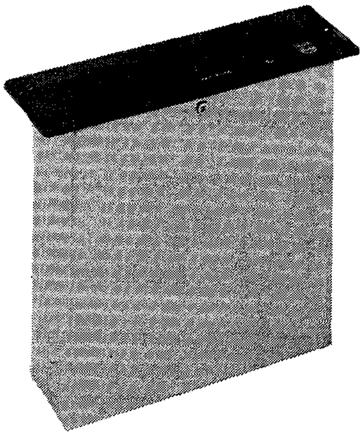
At input 3 of IC2a a DC level of approximately 9V is applied. The microphone signal is fed to the - input of IC2a. The op-amp substracts the microphone signal from the DC level and amplifies the resulting signal. The output signal is now at a 9V DC level on which the amplified microphone signal is superimposed. This signal is then fed to the - input of IC2b; on the + input the audio signal from the disable request line is applied which is superimposed on a 9V DC level from R28. The output of IC2b is the result of the substraction of the microphone signal and the line signal superimposed on a 9V DC level. This output voltage can reduce the voltage on X. The output of IC2a, which is a 9V DC level with the microphone signal superimposed on, can reduce the voltage on Y. When only the delegate is using his unit, the line signal will be the same as the microphone signal and the AC difference voltage at the output of IC2b is 0V, only the 9V DC level is on the output. The voltage on X is now the 9V plus the forward voltage of D6, adding up to a total of 10V. When more than one delegate is speaking, the line signal is greater than the microphone signal.

The difference voltage on the output of IC2b ensures that the 10V on X is reduced.
If the delegate unit is silent, there is no microphone signal, therefore the AC voltage on the 9V DC level at the output of IC2a is 0V. The voltage on Y is at 9V plus the forward voltage of D7 which is 10V. When the delegate microphone is in use, the negative going part of the microphone signal ensures that the 10V on Y is reduced.
X is applied to the + input of IC2c and Y to the - input. When X is greater than Y, the output of the op-amp is at 15V and when Y is greater than X the output is 0V. Therefore when the delegate uses his microphone (he has to speak louder when others are using their microphones) the output of IC2c will be 15V and charges C24. When the delegate stops speaking, the output of IC2c will be 0V and C24 discharges via R35. The voltage on C24 is fed via R36 to the - input of IC3a, when the voltage becomes lower than 7V, the comparator output which was on 0V becomes 15V and resets flip-flop IC5 and the microphone is switched off.
The time taken for C24 to discharge from 15V to 7V is approximately 30 to 45 seconds. When the microphone is switched off, the output of IC2c becomes 15V independant of the number of other switched on microphones. This is because Y is pulled down to 1V by the output of flip-flop IC5a via diode D8.
By placing jumper S3 in the a-b position, C24 cannot discharge and the audio comparator is disabled.

| Pos.: | Description: | Code number: |
|---|---|---|
|  | PCB CONNECTOR 8 PENS | 5322 530 84092 |
|  | DELEGATE CABLE ASSY | 5322 321 21658 |
|  | PCB ASSY | 5322 214 90027 |
|  | KNOB | 5322 414 20129 |
| C1-28 | 10nF 50V | 4822 122 32442 |
| C2-10-17-27-40-44-45 | 100nF 50V | 5322 122 32839 |
| C3-20 | 10uF 25V | 4822 124 21732 |
| C4-6-8-15-21-22 | 4.7uF 25V | 5322 124 21966 |
| C5 | 0.47uF 25V | 4822 124 21453 |
| C7 | 47uF 10V | 5322 124 21975 |
| C9 | 3.3nF 50V | 4822 122 31969 |
| C11 | 47pF 50V | 4822 122 31772 |
| C12-13-23-25-30-31 | 100pF 50V | 4822 122 31765 |
| C14-35 | 22uF 25V | 4822 124 21646 |
| C18 | 82nF 50V | 5322 122 32838 |
| C24 | 100uF 25V | 4822 124 20701 |
| C26-29 | 4.7nF 50V | 4822 122 31784 |
| C32-36 | 47uF 25V | 4822 124 20699 |
| C33 | 47uF 40V | 4822 124 20713 |
| C47 | 22nF 63V | 4822 122 31797 |
| C48 | 470pF 63V | 4822 122 31727 |
| D1-2-5-6-7-8-9-12-13-17 | DIODE BAV70 | 5322 130 34331 |
| D3 | BZX84-C5V1 | 5322 130 32835 |
| D11 | BZX84-C15 | 5322 130 33662 |
| D19 | BZV46-2V0 | 4822 130 31248 |
| D20 | BZX79-B30 | 4822 130 34328 |
| D21 | BZX84-C6V2 | 5322 130 33671 |
| D10A | TIUG164 | 5322 130 32587 |
| D4A | CQW54-V1 | 5322 130 32704 |
| IC1 | LF353N | 5322 209 81395 |
| IC2 | LM324FP | 5322 209 71598 |
| IC3-4 | LM393FP | 5322 209 71599 |
| IC5 | HEF4013BT | 5322 209 14477 |
| R1-96 | 5K6 0.126W | 4822 111 90572 |
| R2-5-46 | 47K 0.125W | 4822 111 90543 |
| R3 | 390E 0.125W | 5322 111 90138 |
| R4-11-13-72-99 | 10K 0.125W | 4822 111 90249 |
| R6-29-52 | 33K 0.125W | 5322 111 90267 |
| R7-30-34-42-47 | 1K 0.125W | 5322 111 90092 |
| R8 | 220K 0.125W | 4822 111 90197 |
| R9 | 220E 0.125W | 4822 111 90178 |
| R12-15-19-22-24-28-36-39-40-41-43-45-49-53-55-60-95-97 | 100K 0.125W | 4822 111 90214 |
| R14 | 560E 0.125W | 5322 111 90113 |

| | | |
|---|---|---|
| R16 | 1K5 0.125W | 4822 111 90151 |
| R17-58 | 12K 0.125W | 4822 111 90253 |
| R18-32-33-37-44-102-103 | 1M 0.125W | 5322 111 90094 |
| R20-26-31 | 18K 0.125W | 4822 111 90238 |
| R21 | 100E 0.125W | 5322 111 90091 |
| R23 | 22K 0.125W | 4822 111 90251 |
| R27 | 39K 0.125W | 5322 111 90108 |
| R35 | 4K7 0.125W | 5322 111 90111 |
| R38 | 10M 0.125W | 5322 111 91141 |
| R48 | 150K 0.125W | 5322 111 90099 |
| R50 | 27K 0.125W | 4822 111 90542 |
| R51-93 | 68K 0.125W | 4822 111 90202 |
| R54 | PTC | 5322 116 44008 |
| R56-57-104 | 15K 0.125W | 4822 111 90196 |
| R59 | 2K7 0.125W | 4822 111 90569 |
| R82-83 | 3K9 0.125W | 4822 111 90571 |
| R92 | 82K 0.125W | 4822 111 90575 |
| R94 | 680E 0.125W | 4822 111 90162 |
| R98 | 390E 2.5W | 5322 116 54401 |
| S3 | LINK,JUMPER | 5322 290 60298 |
| S3 | JUMPER SOCKET,MALE | 5322 265 64028 |
| S1 | SWITCH,PUSH BUTTON | 4822 276 11188 |
| TS1-3-4-5 | BC847C | 5322 130 42755 |
| TS2 | BC857C | 5322 130 42756 |
| TS6-8-9 | BC817-40 | 4822 130 42615 |
| TS7 | BC807-40 | 5322 130 60123 |
| X9 | DIN SOCKET | 5322 267 54107 |
| | 8-P DIN PLUG,MALE | 5322 265 40535 |

LBB 3361/20 FLUSH MOUNTING CHAIRMANS UNIT



## 1. INTRODUCTION CHAIRMANS UNIT

The chairmans unit can be didided into 3 parts:

| | |
|---|---|
| Part 1 | Microphone amplifier<br>Amplifies and limits the microphone input signal. |
| Part 2 | Audio amplifier<br>Amplifies the audio signal, and distributes it to the loudspeaker connection. |
| Part 3 | Microphone and loudspeaker switching circuit<br>Switches the microphone and loudspeaker on/off, depending on the status of the control signals. The control signals comprise of the microphone, remote and priority signals. |

## 2. CIRCUIT DESCRIPTION DELEGATE UNIT

(see circuit diagram)

When the system is switched "on", capacitor C33 charges to the supply voltage 27V. Resistors R48, and R50 cause the voltage on the + input 5 of IC3b to be lower than on the negative input 6. This state is valid until the the power supply voltage reaches 18V. The difference negative voltage, between the negative input and the positive input of IC3, causes the comparator output to be 0V. The 0V is applied to the negative input 2 of IC3a, because the voltage on the positive input 3 is +6V, the comparator output will be high i.e. logic "1". Logic "1" resets the flip-flop IC5a. when switching on the system, if the supply voltage exeeds 15V, the zener diode D11 will conduct, causing the voltage at input 6 to remain at a constant level of 15V. If the power supply voltage exeeds 18V, the voltage at the input of IC3b pin 5, is higher than the 15V on input 6 causing a positive difference voltage, ensuring that the comparator no longer clamps the voltage to zero. 15V is applied to the negative input of IC3a, pin2, which is higher than the +6V on the positive input 3, therefore the output from the comparator is 0V (logic "0"). Logic "0" will no longer reset the flip-flop IC5, and the delegate unit is now ready for use.

### Switching Control Circuit General

The switching control circuit IC5a, IC3a and IC6 carries out all the switching functions in the chairmans unit. Switching is due to the state of the call microphone signal, priority, and remote control lines, the microphone signal or the audio signal to the loudspeaker. IC5a is a flip-flop, who's output is logic "0" (0V) or logic "1" (15V) depending on its input signals. When the output is 0V, the microphone is switched "off" from the pre-amplifier to the audio line. When the output is 15V, the microphone signal via the pre-amplifier, will be switched to the audio line and the loudspeaker is switched "off".

The microphone call signal, from the microphone button, or from the microphones remote control line via IC6, is fed to the clock input of IC5. The clock input to IC5 causes the Q output to go "high", therefore the microphone will be switched on and a connected loudspeaker off. The priortity signal from the priority call button is fed to TS10 and TS11, which ensures that when the priority button is pressed, the microphone is switched on and a 1.5V DC level is switched via the priority line to the delegate units or central control desk when used.

### Listening

In the listening position, the switching control circuit, switches via the loudspeaker switching circuit the audio signal to the audio amplifier and to the loudspeaker. The microphone signal is disconnected from the line via the microphone switching circuit. During listening the clock input of IC5 is "low" because the call button has not been pressed and no remote call via IC6 has been applied. Because there is no set pulse, the output of the flip-flop remains "low". This output is connected to TS5, which forms the microphone switching circuit. 0V on the base of TS5 causes it to not conduct, therefore TS4 which is a part of the pre-amplifier is also non-conductive. The microphone signal on the base of TS4 therefore does not reach the audio line, and acts as if it were switched "off"
The loudspeaker switching circuit, consists of an external NPN transistor and relay. The output of IC5 switches via the transistor the relay which has a break contact in series with the loudspeaker.

### Audio amplifier

The amplifier consists of IC1b, TS6, TS7 and associated components. The audio signal from the audio line is fed via C9 and R19 to the positive input of IC1b, the ground reference is fed to the negative input. The operational amplifier, amplifies the line signal, and the output is a DC level of approximately 14 Volt on which the audio signal is superimposed. The balanced output stage TS7 and TS6 provides the current for driving a low impedance speaker.

### Call position

In the call position, the microphone switching circuit is activated by the switching control circuit. The microphone signal is fed via the Pre-amplifier and switched to the audio line. The loudspeaker is fed via the loudspeaker switching circuit, and switched "off" from the audio amplifier.

The inverting output of flip-flop IC5, which is "high" in the listening position, is fed back to the data input. On the positive edge on the clock input, caused by the call button, this "1" will be clocked to the output. The inverse output will now be "0" and is fed back to the data input. This means that when the next clock pulse occurs, the output will go "low" again. The "1" on the output of the flip-flop is fed to the base of TS5 in the microphone switching circuit, causing it to conduct, whereby TS4 will also be conductive. Current can now flow via the emitter of TS4 to earth and LED D4 illuminates. The microphone signal is taken from the collector of TS4 and fed to the line.

### Pre-amplifier

The pre-amplifier consists of IC1a, TS4 and associated components. A DC voltage is fed via TS1 and applied to the electret microphone line. The current flowing from TS1 to the electret microphone, ensures that the FET inside the microphone is conducting. The analogue microphone signal is applied by the microphone to the microphone line and fed via C1 and C2 to the + and - inputs of operational amplifier IC1a. C1 ensures that the DC voltage for the electret microphone, cannot reach the op-amp. A DC voltage of approximately 4V is fed via R5, R6 and R8 to the microphone signal on the inputs of IC1a. C2 ensures that this DC voltage is not influenced by TS2 and TS3. The output of the op-amp IC1a is fed back via R11/C48 to the - input and via the resistor between X2-5 and X2-6. The resistance value is dependant on the sensitivity of the electret microphone. In this way differences in sensitivity of the microphones are compensated. The amplified signal, a DC level of approximately 10V on which the audio signal is superimposed, is applied to the base of TS4.

### Limiter

The limiter consists of TS2, TS3 and associated components. When the AC output signal of the op-amp IC1a reaches a value greater than 1.4V, D1 or D2 will conduct and so will TS2 or TS3. When either one of these transistors is conducting, the input signal to the pre-amplifier decreases. A sample of the current from the microphone then flows via the conducting transistor to ground and the signal is limited.
The limiter is divided into two sections, the right section D2 and TS3 for the positive AC, and the left section D1 and TS2 for the negative AC of the microphone signal.

### Resetting "call" position

If the call button S1 is pressed again, IC5 receives another positive pulse on its clock input. The inverse output pin 2 was "low", and so is the data input of the flip-flop. After the clock-pulse the "0" will appear on the output, therefore the inverse output will go "high" and so will the data input. The "low" output disables the microphone signal and enables the connected speaker.

## Priority

When the chairman requires priority over the delegate microphones, he presses button S2 continuously. TS11 will conduct, together with TS10. The voltage on the collector of TS10 rises to approximately 15V, thereby switching the microphone signal on the line and a connected loudspeaker off. Due to TS11 conducting, the priority line via D14, D18 and R63 is connected to ground causing it to be at 1.5V. This 1.5V switches the delegate microphones off.
When the priority button is released, TS10 and TS11 will no longer conduct causing the micophone signal to be no longer switched to the line, therefore the priotity line will again be on 27V.

## Disable request

Because the chairman must always be able to switch on his microphone, the microphone switching circuit is not influenced by the disable request line.

## Remote control

Only when a central control desk is connected to the system, the microphone call function can be remotely controlled. The chairman can not request a remote control call by using a request line, but must somehow attract the attention of the control desk operator. The remote line which is at 15V due to resistor R75 is reduced. This voltage is applied to the negative input of IC6. Because the voltage on the positive input is higher, the output will be on 15V and the microphone will be switched on.

| Pos.: | Description: | Code number: |
|---|---|---|
|  | PCB CONNECTOR 8 PENS | 5322 530 84092 |
|  | DELEGATE CABLE ASSY | 5322 321 21658 |
|  | PCB ASSY | 5322 214 90028 |
|  | KNOB | 5322 414 20129 |
| C1-28-37-38 | 10nF 50V | 4822 122 32442 |
| C2-10-39-40-44-47 | 100nF 50V | 5322 122 32839 |
| C3 | 10uF 25V | 4822 124 21732 |
| C4-6-8-15 | 4.7uF 25V | 5322 124 21966 |
| C5 | 0.47uF 25V | 4822 124 21453 |
| C7 | 47uF 10V | 5322 124 21975 |
| C9 | 3.3nF 50V | 4822 122 31969 |
| C11 | 47pF 50V | 4822 122 31772 |
| C12-13-25-30-31 | 100pF 50V | 4822 122 31765 |
| C14-35 | 22uF 25V | 4822 124 21646 |
| C32-36 | 47uF 25V | 4822 124 20699 |
| C33 | 47uF 40V | 4822 124 20713 |
| C48 | 470pF 63V | 4822 122 31727 |
| D1-2-5-12-15-18 | DIODE BAV70 | 5322 130 34331 |
| D3 | BZX84-C5V1 | 5322 130 32835 |
| D11 | BZX84-C15 | 5322 130 33662 |
| D14 | BYW56 | 5322 130 34973 |
| D16 | BZV49-C6V2 | 5322 130 33672 |
| D19 | BZV46-2V0 | 4822 130 31248 |
| D20 | BZX79-B30 | 4822 130 34328 |
| D21 | BZX84-C6V2 | 5322 130 33671 |
| D4A | CQW54-V1 | 5322 130 32704 |
| IC1 | LF353N | 5322 209 81395 |
| IC3 | LM393FP | 5322 209 71599 |
| IC5 | HEF4013BT | 5322 209 14477 |
| IC6 | UA741CFP | 5322 209 71597 |
| R1 | 5K6 0.126W | 4822 111 90572 |
| R2-5-46-65 | 47K 0.125W | 4822 111 90543 |
| R3 | 390E 0.125W | 5322 111 90138 |
| R4-11-13-66-72 | 10K 0.125W | 4822 111 90249 |
| R6-29-52-69 | 33K 0.125W | 5322 111 90267 |
| R7-30-34-42 | 1K 0.125W | 5322 111 90092 |
| R8 | 220K 0.125W | 4822 111 90197 |
| R9 | 220E 0.125W | 4822 111 90178 |
| R12-15-19-22-24-28-36-43-45-49-53-55-60-61-62-68-70-75-97 | 100K 0.125W | 4822 111 90214 |
| R14 | 560E 0.125W | 5322 111 90113 |

| | | |
|---|---|---|
| R16 | 1K5 0.125W | 4822 111 90151 |
| R17-58 | 12K 0.125W | 4822 111 90253 |
| R18-32-33-37-44-67-102-103 | 1M 0.125W | 5322 111 90094 |
| R20-26-31 | 18K 0.125W | 4822 111 90238 |
| R21 | 100E 0.125W | 5322 111 90091 |
| R23 | 22K 0.125W | 4822 111 90251 |
| R27 | 39K 0.125W | 5322 111 90108 |
| R35 | 4K7 0.125W | 5322 111 90111 |
| R48 | 150K 0.125W | 5322 111 90099 |
| R50 | 27K 0.125W | 4822 111 90542 |
| R51-93 | 68K 0.125W | 4822 111 90202 |
| R54-63-71 | PTC | 5322 116 44008 |
| R56-57 | 15K 0.125W | 4822 111 90196 |
| R59 | 2K7 0.125W | 4822 111 90569 |
| R92 | 82K 0.125W | 4822 111 90575 |
| R94 | 680E 0.125W | 4822 111 90162 |
| R98 | 390E 2.5W | 5322 116 54401 |
| S1-2 | SWITCH,PUSH BUTTON | 4822 276 11188 |
| TS1-3-4-5 | BC847C | 5322 130 42755 |
| TS2-10 | BC857C | 5322 130 42756 |
| TS6-8-9-11 | BC817-40 | 4822 130 42615 |
| TS7 | BC807-40 | 5322 130 60123 |
| X9 | DIN SOCKET | 5322 267 54107 |
| | 8-P DIN PLUG,MALE | 5322 265 40535 |

Distance piece d1 with associated bolts is delivered together with the LBB 3302/00.

Distance piece d2 with associated bolts is delivered together with the LBB 3301/00.

## 5. RECOMMENDED SPARE PARTS LIST P.C.B.´s

| | |
|---|---|
| Basic P.C.B., LBB 3300/.. | 5322 216 93789 |
| Connector panel, LBB 3300/.. | 5322 216 93791 |
| Microphone plug-in PCB, LBB 3302/00 | 5322 216 93792 |
| 6ch desk PCB, LBB 3221/00 | 5322 216 93767 |
| P.C.B., LBB 3350/00 | 5322 216 93844 |
| P.C.B., LBB 3351/00 | 5322 216 93845 |
| P.C.B., LBB 3450/00 | 5322 216 93845 |
| P.C.B., LBB 3451/00 | 5322 216 93845 |
| P.C.B., Loudspeaker unit | 5322 216 93759 |

The LBB 3203/00, M.D.B., cannot be delivered via Concern Service in Eindhoven under any service codenr., but has to be ordered under typenr. in Breda when needed for service purposes.

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2. System block diagram C.S.U. and peripherals
3. Detailed block diagram C.S.U. and peripherals with 1$^e$ line data
4. Exploded view C.S.U.

## 1. CCS400 AUDIO PRINCIPLE

In the C.S.U. the mixing amplifier IC4a amplifies and mixes the different inputs (chime, telephone coupler, tape recorder and line in) TS14 and associated circuitry act like a current modulator. $I_{ac1}$ is a modulated current according to $U_{ac1}$.

Every delegate unit consists of the same circuitry. IC1a amplifies the microphone signal and TS4 and associated circuitry act like the current modulator. $I_{ac2}$ is amodulated current according to $U_{ac2}$.
$I_{ac3}$ is a modulated current according to $U_{ac3}$, etc.
$I_{act}$ in the C.S.U. is directly proportional with $I_{ac1} + I_{ac2} + I_{ac3} + ....$
The very high impedance on the audio line ensures that the resistance value of S101 does not affect $I_{act}$. $U_{ac} = I_{act} \times R$, $I_{act}$ is independant of R (S101).
$U_{ac}$ is directly proportional with R.

By changing R with switch S101, $U_{ac}$ changes. The AC voltage on the audio line, $U_{act}$ which is the "audio signal", can be adjusted via S101, which actually changes the value of R The audio signal level can be changed in steps of 3dB.

At the input of amplifiers A, B and C in the C.S.U., the $U_{ac}$ is constant and cannot be adjusted by changing the R value via S101.

In the delegate unit (and chairmans unit) the AC voltage on the audio line is amplified by $IC1_b$ when the microphone is switched off.

## 2. GENERAL SYSTEM TEST

- Check if the voltage selector is in the correct position.

- Check mains fuse (2.5a slow).

- If problems arise in the audio distribution, check if the 6-position system gain rotary switch is in the correct position.
  If the delegate unit don´t switch off automatically after approximately 30 seconds of no speech activity, then check if the rotary switch for selecting the maximum number of microphones is in the "auto position".

- When using the 6 channel interpreters equipment, check if the interpreters desks are adjusting accorded to the instructions in the installation manual.

- If a tape recorder is used in the system, ensure that the input level potentiometer is adjusted correctly (screwdriver adjustment on the front side).
  To match the output to a DIN-type connector, or a Cinch connector, the inpedance must be adjusted by S5 to respectively high ohmic or to low ohmic.

- When using a telephone coupler, ensure if the jumper S4 is in the correct position for enabling or disabling the side tone reduction.
  Check if S2 for telephone input level and S6 for conference output level are adjusted in the right position.
  At last ensure that the telephone coupler itself is adjusted correct for being compatible with CCS400.

- Using the line input, ensure that the jumper S3 is in the correct position for the desired input level.

- Using the line output, check if the system gain rotary switch is in the correct position for the desired output level.

## 3. TEST INSTRUCTIONS CCS400

1. Adjust the voltage adapter at the local mains voltage.

2. Load DEL1 (BU101-7, 8) so that the consumed current is 0.55A.

   Load DEL2 (BU104-7, 8) so that the consumed current is 0.15A.

   Load INT (BU207-24, 12) so that the consumed current is 1A.

   Requirement: output voltage: 26,5 v ± 2v.

   Load DEL1 so that consumed current is 0.15A.
   Load DEL2 so that consumed current is 0.55A.

   Requirement: output voltage: 26,5 v ± 2v.

3. Shortcircuit the power suply output DEL1.
   (BU101-7), DEL2 (BU104-7) and INT (BU207-24) alternately (the load remains connected).
   Check the short-circuit current.
   Requirement: ≤ 150 MA
   Remove the short circuit. Requirement: power supply voltage: 26,5 v ± 2v.

4. Remove the three loads (DEL1, DEL2 and INT).
   Measure the power supply output voltage:
   requirement: 26,5 ± 2v.

Audio measurements Master Gain switch S101 at minimum

1. Line input
   Source impedance: 1 Kohm
   Control the line input BU103-1/BU103-3 with a signal of -4 dB (Jumper S3 in a-b position).
   Measure the signal at BU104-3.
   Requirement: amplification -17,5 dB ± 0,5 dB.

   Secundary side of T1: approx. -28 dB.
   - Input IC4a: approx. -72 dB
   Output IC4a : approx. -8,5 dB
   BU104-3: 21,5 dB ± 0,5 dB.
   Control the line input BU103-1/BU103-3 with a signal of + 6 dB (jumper S3 in a-c position)
   Requirement: amplification -28 dB ± 2 dB.
   Secundary side of T1: approx. -29 dB.
   - Input IC4a: approx. -68 dB.
   Output IC4a: approx. - 9,5 dB.
   BU104-3: -22 dB ± 2 dB.

2. Tape play back input
Adjust R104 at minimum (left) or at maximum (right).

Control one ot the two symetrical tape recorder inputs BU106-3 or BU106-5 with a signal of +20 dB or -8 dB.

Measure the signal at BU104-3.

| | R 104 minimum | | R 104 maximum | |
|---|---|---|---|---|
| | input +20dB | input -8dB | input +20dB | input -8dB |
| -Input IC4a | - 59 dB | - 86 dB | - 7 dB | - 69 dB |
| Output IC4a | + 4 dB | - 24,5 | + 18 dB | - 7 dB |
| BU104-3 | - 9 dB | - 37 dB | + 3 dB | - 20 dB |
| Amplification | - 29 dB | - 29 dB | - 17 dB | - 12 dB |

Requirements: amplification with R104 minimum ≤ - 40 dB.
amplification with R104 maximum - 12 dB ± 0,5 dB.

3. a. Tel. coupler input
Source impedance < 100 Ohm.

Control the input BU105-5 with a signal of -16 dB, -4 dB or + 6 dB.

Measure the signal at BU104-3

| | S2 in pos.a-c<br>input -16dB | S2 in pos.a-b<br>input -4 dB | S2 in pos.b-d<br>input + 6 dB |
|---|---|---|---|
| + of C 35 | - 16 dB | - 16 dB | - 15,5 dB |
| -Input IC4a | - 70 dB | - 70 dB | - 69 dB |
| Output IC4a | - 8,5 dB | - 8,5 dB | - 8 dB |
| BU104-3 | -21,6 dB | - 21,6 dB | - 21 dB |
| Amplification | -5,25 dB<br>± 0,5 dB | - 17,25 dB<br>± 0,5 dB | - 26,75<br>± 0,5 dB |

### b. Tel. coupler output

Load the output BU105-4 with 10 K Ohm.
Jumper S4 in AC position.

Control the input BU105-5 with a signal of -16 dB, -4 dB or + 6 dB.
Measure the signal at BU105-4.

| | S6 in pos.a-c input -16 dB | S6 in pos.a-d input -4 dB | S6 in pos. b-c input + 6 dB |
|---|---|---|---|
| BU 105-4 | - 16 dB | - 4 dB | + 6 dB |
| Amplification | 0 dB | 0 dB | 0 dB |

Amplification requirement: + 0,5 dB ± 1 dB.

Side tone reduction: put jumper S4 in a-b position.

Control the input BU105-5 with a signal of -16 dB.
Measure the signal at BU105-4.
Jumper S2 in position a-c.
Jumper S6 in position a-c.

| | |
|---|---|
| + of C35 | - 16 dB |
| - Input IC4a | - 70 dB |
| Output IC4a | - 8,5 dB |
| - Input IC4b | - 80 dB |
| Output IC4b | - 16 dB |
| - Input IC7b | approx. -80 dB |
| Output IC7b | - 47 dB |

Amplification: -47 dB -(- 16 dB) = -31 dB.

Side tone reduction: 31 dB
Required amplification: ≤ -20 dB.
Required side tone reduction ≥ 20 dB.

## 4. Line output

Control the tape recorder Play back input BU106-3 or BU106-5 with a signal so that at BU104-3 a signal of -21 dB is present. Ensure that the Master Gain switch S101 is positioned at minimum. Load the line output with 10 k Ohm parallel with 1,5 nF. (connect BU102-1 and BU102-3 together).

Measure at the line output.

Requirement: -6,5 dB. Amplification with respect to BU104-3 is
+ 14,5 dB ± 0,5 dB.

Tape rec. play back input BU106-3 or BU106-5: + 6 dB
- Input IC4a: - 78 dB
Output IC4a: - 8 dB
+ Input IC3a: - 21,4 dB
Output IC3a: - 1,5 dB
Line output : - 6,5 dB

## 5. Interpreters floor

Control the tape recorder play back input BU106-3 or BU106-5 with a signal, so that at BU104-3 a signal of -24 dB is present. Ensure that the Master Gain switch S101 is positioned at minimum.

Measure at the floor output BU207-1 or BU207-14.

Requirement: amplification with respect to BU104-3 is + 17 dB ± 0,5 dB.

Tape rec. play back input BU106-3 or BU106-5: + 3 dB.
- Input IC4a : - 75 dB
Output IC4a : - 11 dB
+ Input IC3b : - 32,5 dB
Output IC3b : - 2 dB
BU207-1 : - 7 dB
Amplification: + 17 dB

## 6. Tape recorder output

Control the tape recorder play back input BU106-3 or BU106-5 with a signal, so that at BU104-3 a signal of -21 dB is present. Ensure that the Master Gain switch S101 is positioned at minimum.

Jumper S5 in position a-b: output impedance is 220 kOhm (unloaded).

Load the tape recorder output BU106-1 or BU106-4 with 1 k Ohm and measure this output.

Requirement: amplification with respect to BU104-3 is - 49 dB ± 0,5 dB.

Jumper S5 in position a-c: output impedance is approx. 600 Ohm (unloaded)

Load the tape recorder output BU106-1 or BU106-4 with 1 k Ohm and measure this output.

Requirement: amplification with respect to BU104-3 is -6 dB ± 0,5 dB.

7. Disable request output

Control the tape recorder play back input BU106-3 or BU106-5 with a signal, so that at BU104-3 a signal of -21 dB is present.

Measure the signal at the disable request output BU104-2.

Requirement: output at BU104-2 is -26,5 dB ± 0,5 dB.

8. Gain reduction circuit

Load BU104-3 for DC only.
Adjust the load so that the AC-signal at BU104-3 will be attenuated 3 dB ± 0,5 dB by IC6.
(control e.g. the tape recorder play-back input with an AC-signal).

Perform this in every position of Master Gain switch S101.

9. Disable request circuit

Load BU104-3 for DC only.
Adjust the load so that the DC level at BU104-2 changes over.
Ensure that S102 is in one of the positions 1, 3 or 6 microphones and in "auto off".

With a load > 3.9 k Ohm the DC level is approx. 1.6 v.
Requirement: < 3v

With a load < 3.9 k Ohm the DC level is approx. 24.5 v.
Requirement: > V _ 3 v
= > 24 v

The direct current, through the load when the DC level is high:

2.65 mA ± 0,8 mA, 16,6 mA ± 2 mA, 30,5 mA ± 3,5 mA (dependant of position S 102).

Control the "limiter on/off" input BU101-5 with a DC-voltage. When the DC-level at BU104-3 is high (24v).

Requirements: input BU101-5 is 3v, BU104-3 remains high (24v).
input BU101-5 is 15v, BU104-3 becomes low (3v).
the limiter is now switched "off" the disable request line is inactive low.

10. Priority signal

Connect a load between BU104-1 and BU104-8 adjust this load so that the current is 0.2 mA. The voltage at the base of TS10 is in this case to low, the priority signal will not be generated.

Adjust the load so that the current is 0,3 mA.
The voltage at the base of TS10 now starts the oscillator circuit and the priority tone will be heard when a delegate unit is connected.

11. Monitor circuit

Node BU210-2, -11, -3, -10, -4 and -12 together and connect this point via an ampere meter to BU210-5 (ground).
Control successively the points BU207-20, -22, -19, -17, -16 and -10 with a voltage of 17v (with respect to e.g. BU209-12).

Requirement: the current < 0,1 mA
which corresponds to "channel not engaged".

Control now successively the same points with a voltage of 15v (with respect to e.g. BU209-12).

Requirement: the current is 2,5 mA ± 0,5 mA which corresponds to "channel engaged".

Load BU210-13 with a resistor of 330 Ohm (to BU210-5).

Requirement: Voltage at BU210-13 is 5v ± 0,5v.

## REPLACING ADJUSTMENT RESISTOR

By changing the microphone capsule in a delegate unit, chairmans unit the amplification of the microphone signal in this units must be adjusted again. The amplification of the microphone amplifier $IC1_a$ must be adapted to the sensitivity of the microphone capsule. This can be done by placing the correct resistor between X2-5 and X2-6 in the feed back path. of IC1a.

Adjust procedure

Use a reference unit which is already adjusted correctly e.g. one unit of the whole system. Connect this unit to the DEL1 socket of the C.S.U. or connect X10-7 (+) and X10-8 (-) to a 27v power supply. Place at a distance of approximately 30 cm an audio generator (e.g. sinus signal) with a frequency of 1 KHz. Adjust the level of the generator so that at mp7 in the reference unit -7 dB occur. This -7 dB level must be measured with respect to the electrical ground X10-8. This "reference level" at mp7 corresponds to a S.P.L. of 85 dB, which is now generated by the audio generator.

Replace the reference unit by the unit which has to be adjusted. Between X2-5 and X2-6 of the unit a potentiometer or a decade resistor instrument (both 0 to 50 K ohm) must be placed instead of the "old" resistor. Adjust the potentiometer or decade instrument so that at mp7 in the unit a level of -7 dB occurs. Replace the potentiometer or decade instrument by a 1% resistor of the same value. With this "new" resistor between X2-5 and X2-6 the unit is correctly adjusted, the microphone signal amplification is now adapted to the sensitivity of the "new" microphone capsule in the unit.

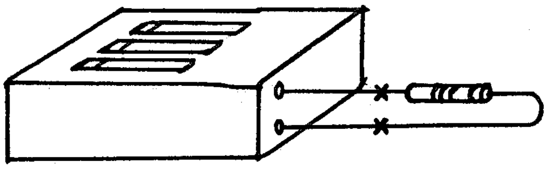
The minimum resistance between X2-5 and X26 is 3K6.
The sensitivity of the microphone capsule is maximum.
The maximum resistance is 43K, the microphone capsule sensitivity is minimum.
These maximum and minimum resistance values count for the delegate unit, chairmans unit and for the microphone LBB3175/00 (for FM systems).

For the handmicrophone LBB 3175/50 the following min. and max. resistance values apply
minimum resistance value is 2K and maximum 43K.

## 4. MOUNTING AND DISMOUNTING THE C.S.U.

For system block diagram see fig. 2 and 3.
For mounting and dismounting the C.S.U. and the P.C.B.´s in this unit see fig. 4.

1



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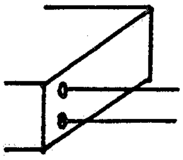

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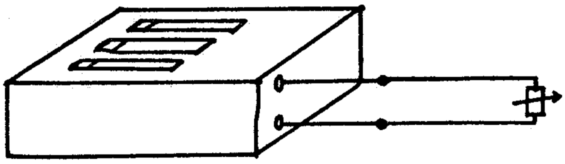

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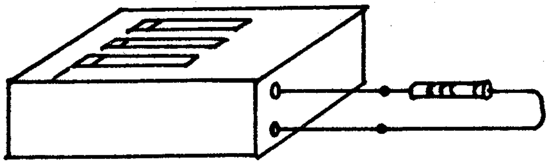


## DISMOUNTING P.C.B.´s

Dismounting the various P.C.B.´s from the C.S.U. housing must be carried out in the following sequence:

1. Basis P.C.B.
2. Microphone plug-in unit LBB 3302/00 (only if added to the C.S.U.)
3. Monitor Distribution Board LBB 3203/00 (only if added to the C.S.U.)
4. Connector panel and Int. + monitor panel LBB 3301/00 (only if added to the C.S.U.) simultaneously

For mounting the P.C.B.´s into the C.S.U. place them in the inversed sequence.

1. Basic P.C.B.

   - Unscrew bolts 1.1, 1.2, 1.3 and 1.4 (1.1 only when a LBB 3302/00 is added to the system).

   - Unscrew next the two bolts 1.5 and 1.6.

   - Finally take out the P.C.B. by pulling X2 out of X102.

2. Microphone plug-in unit + distance piece d1 LBB 3302/00.

   - Unscrew bolts 2.2 and 4.4.

   - Take out the P.C.B. by simply pulling X3 out of X101.

3. Monitor Distribution Board LBB 3203/00

   - Unscrew bolts 3.1 and 3.2 (distance piece d2 remains fitted in the C.S.U.).

   - Pull the P.C.B. out of connector X201.

4/5.Connector panel and Int. + monitor panel LBB 3301/00

- Unscrew bolts 4.1 until 4.5 inclusive.

- Remove the two dial knobs on the front side of the C.S.U.

- Unscrew next the bolts 5.1, 5.2 and 5.3.

- Remove the connector panel and the LBB 3301/00 simultaneously now and separate them by pulling X103 out of X203.

## Adding a P.C.B. LBB 3302/00 to the system

- Unscrew the two bolts 6.1 and 6.2.
- Remove the plate P1.
- Add the LBB 3302/00 to the system by pushing X3 into X101.
- Screw the bolts 2.2 and 4.4.
- Finally screw bolt 1.1 in the distance piece via the basic P.C.B.

## Adding a P.C.B. LBB 3301/00 to the system

- Unscrew the two bolts 7.1 and 7.2.
- Remove the plate P2.
- Disconnect the basic P.C.B. as described in 1.
- Disconnect the LBB 3302/00 as described in 2. (only if added to the C.S.U.).
- Disconnect the connectorpanel as described in 5.
- Add the LBB 3301/00 to the system by pushing X203 into X103 (from connectorpanel).
- Place next the connector panel and the LBB 3301/00 simultaneously in the C.S.U. housing.
- Screw bolts 4.1 until 4.5 inclusive and bolts 5.1 until 5.3 inclusive.
- Place the basic P.C.B. back by plugging X2 into X102 (on connector panel).
- Screw bolts 1.2, 1.3, 1.4, 1.5 and 1.6.
- Place back the LBB 3302/00 (only if added to the system) by plugging X3 into X101 (on connectorpanel).
- Screw the bolts 1.1, 2.2 and 4.4.

## Adding the LBB 3302/00 to the system

- Plug the LBB 3203/00 into X201.
- Place the distance piece d2 between the LBB 3203/00 and the bracket (in the C.S.U.) by the two bolts 3.2 and 3.3.
- Finally screw bolt 3.1.

## CONTENTS

1. SOLDERING AND DESOLDERING OF SMD

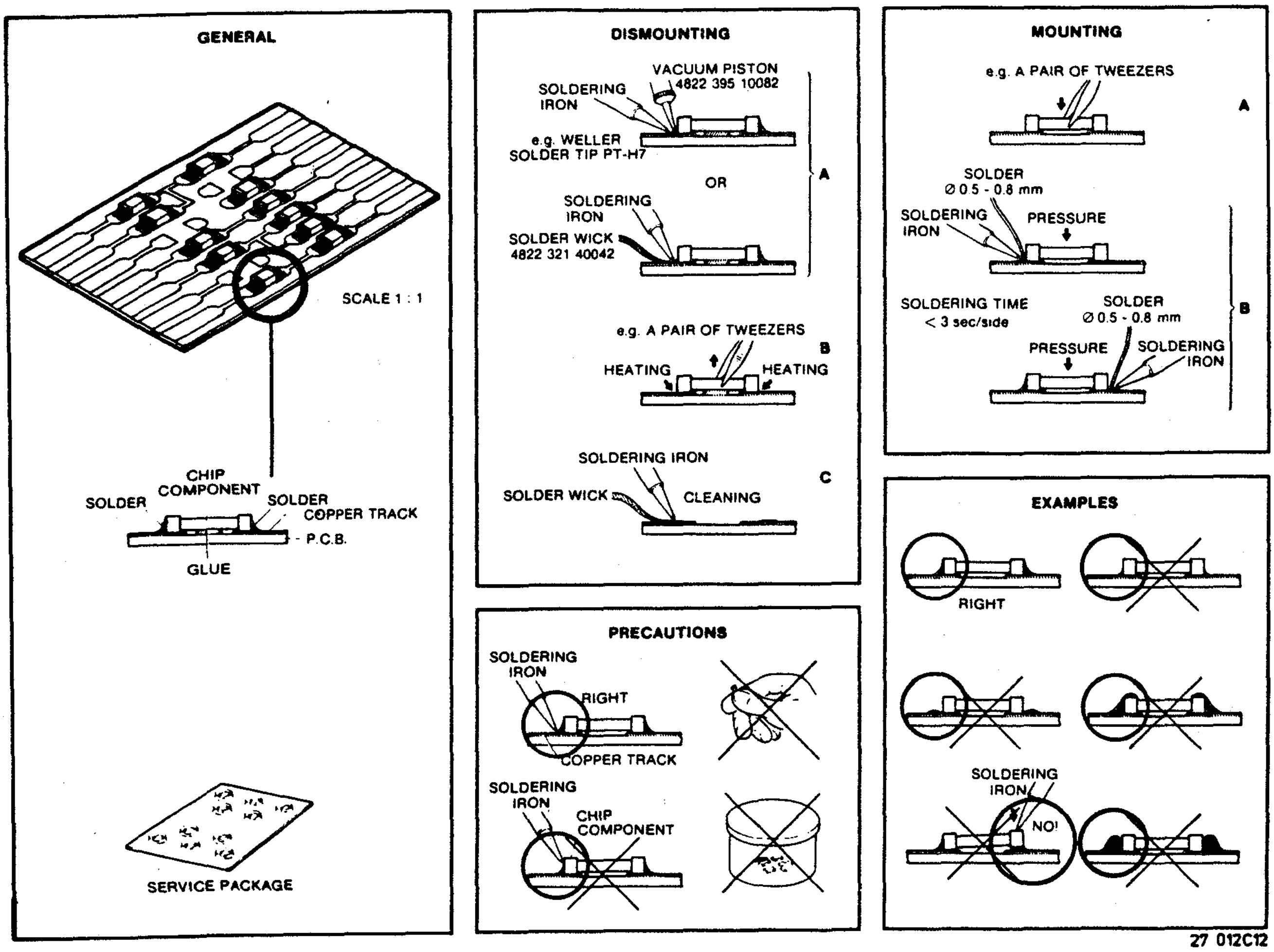
2. TECHNICAL SPECIFICATION CCS400

## 1. SOLDERING AND DESOLDERING OF SMD´s

### Introduction

This description gives you a method for replacing surface mounted devices (SMD´s) and incorporates subjects such as:

- required tools and materials
- how to arrange the SMD-workshop
- general hints for SMD-handling
- interchanging SMD´s with two or three connections
- interchanging SMD´s with four or more connections


GENERAL
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COPPER TRACK
P.C.B.
GLUE
SERVICE PACKAGE
DISMOUNTING
VACUUM PISTON 4822 395 10082
SOLDERING IRON
e.g. WELLER SOLDER TIP PT-H7
OR
A
SOLDERING IRON
SOLDER WICK 4822 321 40042
e.g. A PAIR OF TWEEZERS
B
HEATING
HEATING
SOLDERING IRON
C
SOLDER WICK
CLEANING
PRECAUTIONS
SOLDERING IRON
RIGHT
COPPER TRACK
SOLDERING IRON
CHIP COMPONENT
MOUNTING
e.g. A PAIR OF TWEEZERS
A
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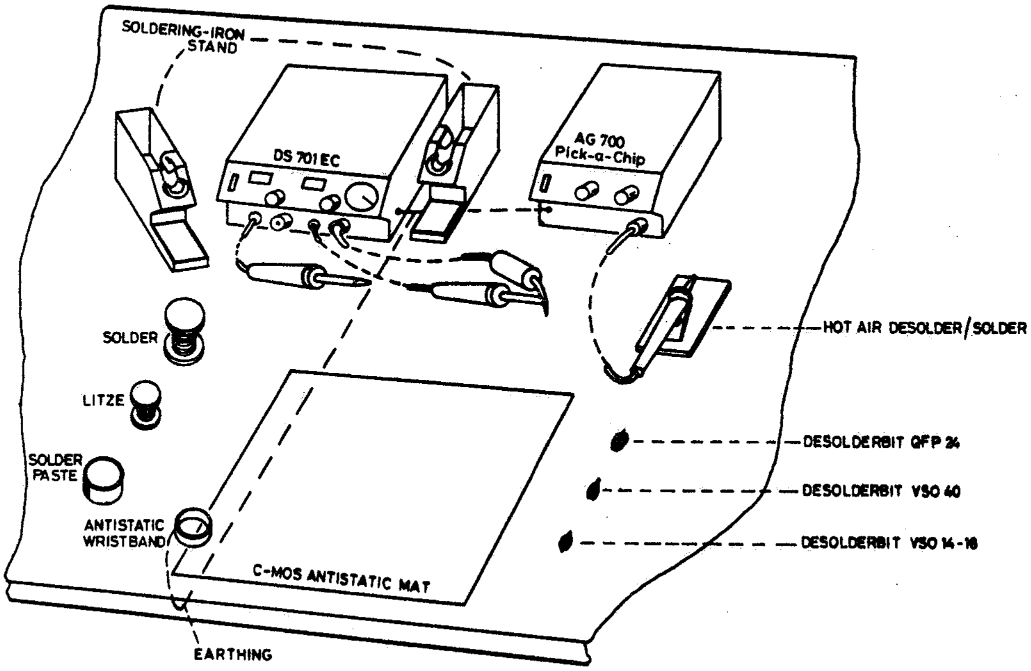
SOLDERING IRON
PRESSURE
SOLDERING TIME < 3 sec/side
SOLDER Ø 0.5 - 0.8 mm
B
PRESSURE
SOLDERING IRON
EXAMPLES
RIGHT
SOLDERING IRON
NO!

27 012C12


SOLDERING-IRON STAND
DS 701 EC
AG 700 Pick-a-Chip
HOT AIR DESOLDER/SOLDER
SOLDER
LITZE
SOLDER PASTE
ANTISTATIC WRISTBAND
DESOLDERBIT QFP 24
DESOLDERBIT VSO 40
DESOLDERBIT VSO 14-16
C-MOS ANTISTATIC MAT
EARTHING

Arrangement of working area for SMD exchange

## Required tools and materials

The following tools are necessary:

- A hot-air soldering/desoldering station for components with two or three leads: Weller AG 700 pick-a-chip.
- A vacuum, temperature controlled, soldering/desoldering station for components with four or more connections: Weller DS 701 EC.
- Desoldering accessories that can be attached to the Weller DS 701 EC-equipment.
- A working area that has been secured against electro static discharge (ESD).
- A pair of tweezers.

The following material is necessary:

- "Fluittin" solder.
- Solder paste.
- Components; since not all the components are marked, they must be kept in their original packing in order to avoid interchanging them.
- Desoldering braided wire.

## General hints for SMD-mounting

- Protection against ESD: since the working area must be suitable for repair of MOS-devices, some precautions must be taken. All repairs must be done earthened which means that the repair surface, the soldering iron and the technician must be connected to the earth potential. This is achieved by using a C-MOS antistatic mat that must be connected to earth. The serive-technician is connected to earth by wearing an antistatic wristband.
- Components: desoldered components cannot be used again since desoldering is done at a temperature of 350 degrees Celcius while they can only withstand 240 degrees Celcius for max. 10 sec. Keep the new components as long as possible in their original packing in order to avoid damage and mixing up new and old SMD´s.

- For an optimal supply of heat a working area must be used that does not lead away the heat: the antistatic mat meets this requirement.

## Interchaning SMD's with two or three connections

**IMPORTANT:**
Before removing the component, observe very carefully its position in order to avoid that the new component is installed upside-down. This is especially important for capacitors where the metalisation at both ends is longer at the PCB side than at the top side.

Use the equipment Weller AG 700 pick-a-chip and proceed as follows:

- Heat the component up equably with hot air of 350 degrees Celcius.
- Remove the component with a pair of tweezers.
- Clean the PCB tracks, on which the new component has to be soldered, with braided wire or with the use of the vacuum desoldering equipment DS 701 EC.
- Put solder paste on the connections of the new component and position it on the PCB.
- Solder the component on to the PCB with the solder described in the materials list. Soldering temperature must 240 degrees Celcius, soldering time must not exceed 3 sec. per connection. The tip of your soldering iron must not touch the component, but must touch the PCB track close to the component.

## Interchanging SMD's with four or more connections

Use the equipment Weller DS 701 EC and attach a suitable desoldering piece. Then proceed as follows:

- Adjust the desoldering temperature to 350 degrees Celcius and place the desoldering piece on the IC that has to be removed.
  Take care that all connections of the IC are equally heated up).
- Switch the vacuum on and lift the component from the PCB.
- Clean the PCB tracks, on which the new component has to be soldered, with braided wire or with the use of the vacuum desoldering equipment DS 701 EC.
- Put solder paste on the connections of the new component and position it on the PCB.
- Position the component by soldering first the outside connections in a crosswise manner. Soldering temperature must be 240 degrees Celcius. Keep soldering time as short as possible.
- Solder not the other connections.
- If necessary you must remove superfluons rests of solder with the use of braided wire.

## 2. TECHNICAL SPECIFICATIONS

Power supply general:

Mainswitch (a)
Power on LED (n)
Voltage adapter (c,d): 110, 127, 220 and 240 Volt ± 10%
Fuse (b)
Mains cord: 170 cm
Supply voltage: 26,5 ± 2 Volt
Max. current consumption of discussion distribution and interpreter systems: $\leq$ 1,7 Amp.

### Delegate connectors (BU101 and BU104)

Two 8-pole female 270° DIN connectors (e,f) to interconnect the delegate units to the system.

Connections:

| | |
|---|---|
| BU101-1; BU104-1 | Priority input<br>Priority and chime activate: current sink $\geq$ 0,3 mA<br>Level manual priority mode : 5,5 to approx. 2/3 Ub Volt |
| BU102-2; BU104-2 | Disable request<br>Request enabled : $\leq$ 3 V<br>disabled : $\geq$ Ub - 3 V<br>Output impedance: 10 kOhm<br>On this line a AC voltage is superimposed for the automatic microphone switch-off circuit. |
| BU101-3; BU104-3 | Floor line (live)<br>DC level : approx. 10 Volt<br>Max. line current: 40 mA<br>Line AC impedance: 168E to 972E ± 5% (in 6 steps)<br>This value decreases approx. 30% when two or more microphones are switched on. |
| BU104-4; BU104-4 | Floor line (ground reference)<br>This line is the AC ground reference<br>ADC voltage is superimposed for the micr. auto switch off circuitry<br>auto off : 0 V<br>auto on : 9 V |
| BU101-6 | Not connected |
| BU104-5 | Power supply for central control desk |
| BU101-5 | Disable max. number of switched-on microphones<br>Disable level : > 9 Volt |
| BU104-6 | Not connected |

| | |
|---|---|
| BU101-7; BU104-7 | Positive supply voltage |
| BU101-8; BU104-8 | Negative supply voltage<br>For capacity of the power supply see limits of the system. |

## Line output (BU102)

| | |
|---|---|
| 5-pole 180° female DIN connector (g) | |
| BU102-4 | Not connected |
| BU102-2 | Ground reference |
| BU102-5 | Not connected |
| BU102-1, 3 | Floating output<br>Output impedance : < 200 E<br>Load impedance : ≥ 10 K<br>Output level (gain switch -12 dB) : -4 to +6 dB |

## Line input (BU103)

| | |
|---|---|
| 5-pole 180° | female DIN connector (h) |
| BU103-4 | Not connected |
| BU103-2 | Ground reference |
| BU103-5 | Not connected |
| BU103/1, 3 | Floating input<br>Input impedance : > 10 K<br>Input level : presettable -4 dB or +6 dB by an internal jumper |

## Telephone coupler (BU105)

| | |
|---|---|
| 7-pole 270° | Female DIN connector (i) |
| BU105-1,2,3 | Not connected |
| BU105-4 | Output (to coupler)<br>Impedance : ≤ 50 E<br>Level : -16, -4, +6dB ± 1 dB presettable |
| BU105-5 | Input (from coupler)<br>Impedance : 6K, 24K, 71K ± 10%<br>Level : -16, -4, +6dB ± 1dB presettable |
| BU106-6 | Negative supply voltage |
| BU107-7 | Positive supply voltage |

## Tape recorder connector (BU106)

| | |
|---|---|
| 5-pole 180° | Female DIN connector (j) |
| BU106-1 | Output (to recorder)<br>Impedance : 510 E or 220 K ± 10% presettable<br>Level : -24 dB |
| BU106-2 | Ground reference |
| BU106-3 | Playback input left (from recorder)<br>Impedance : > 30 K<br>Level : -8 dB to +21 dB adjustable with |

| | |
|---|---|
| | potmeter (k) |
| BU106-4 | Interconnected with BU106-1 |
| BU106-5 | Playback input right (from recorder)<br>Specifications see BU106-3 |

## Interpreter system connector (BU207)

25-pole female lockable D-connector (r)
(Only when LBB 3301/00 is placed in the central)

| | |
|---|---|
| BU207-1, 14 | Floorline |
| BU207-2, 16 | Channel 2 |
| BU207-3, 15 | Auto floor channel |
| BU207-4, 18 | Channel 1 |
| BU207-5, 17 | Channel 3 |
| BU207-6, 20 | Channel 6 |
| Bu207-7, 19 | Channel 4 |
| BU207-8, 22 | Channel 5 |
| BU207-9, 21 | Communications interpreters |
| BU207-10 | Protected ground |
| BU207-11,23 | Not connected |
| BU207-12,13 | Negative supply voltage |
| BU207-24,25 | Positive supply voltage<br>See limits of the system |

## Distribution connector (BU208)

15-pole female lockable D-connector (q)
(Only when LBB 3301/00 and LBB 3203/00 are placed in the central)

| | |
|---|---|
| BU208-1, 10 | Channel 6 |
| BU208-2, 9 | Channel 5 |
| BU208-3 | Not connected |
| BU208-4, 12 | Channel 4 |
| BU208-5, 11 | Channel 3 |
| BU208-6, 14 | Channel 2 |
| BU208-7, 13 | Channel 1 |
| BU208-8, 15 | Floor channel<br>Unloaded level : 24 dB<br>Load impedance : > 50 E |

## Transmitter connector (BU209)

25-pole female lockable D-connector (s)
(Only when LBB 3301 is placed in the central)

| | |
|---|---|
| BU209-1, 14 | Floorchannel |
| BU209-2, 16 | Channel 2 |
| BU209-4, 18 | Channel 1 |
| BU209-5, 17 | Channel 3 |
| BU209-6, 20 | Channel 6 |
| BU209-7, 19 | Channel 4 |
| BU209-8, 22 | Channel 5 |
| BU209-9, 21 | Communication interpreters |
| BU209, 24 | Not connected |

| | | |
|---|---|---|
| BU209-12,13 | Ground reference | |
| BU209-3 | Channel 3 } | |
| BU209-10 | Channel 1 } | |
| BU209-11 | Channel 5 } | Channel occupied |
| BU209-15 | Channel 6 } | indicator lines |
| BU209-23 | Channel 2 } | |
| BU209-25 | Channel 4 } | |

Monitor connector (BU210)
--------------------------

15-pole female lockable D-connector (p)
(Only when LBB 3301 and LBB 3203/00 are placed in the central)

| | | |
|---|---|---|
| BU210-1, 9 | Loudspeaker output | |
| | Unloaded level | : +24 dB |
| | Load impedance | : > 50 E |
| BU210-6 | Not connected | |
| BU210-13 | Supply voltage 5 Volt | |
| BU210-14,7,15,8 | Monitor select lines Ao, A1, A2 and A3 | |
| BU210-2 | Channel 6 } | |
| BU210-3 | Channel 4 } | channel occupied |
| BU210-4 | Channel 3 } | indicator lines |
| BU210-5 | Ground ref. } | |
| BU210-10 | Channel 3 } | |
| BU210-11 | Channel 5 } | |
| BU210-12 | Channel 1 } | |

LBB 3302/00 Roving microphone plug in unit
-----------------------------------------

9-pole female squeeze to release D-connector
6-pole interequipment connector

This unit is a P.C.B. that has to be installed in the LBB 3300/00. Microphone switch, red micr. on and green micr. request LED are provided in the handmicrophone.

Electrical specification
Supply voltage : 20 - -28V
Supply current : typ 9,5 mA
Frequency range : 150 Hz - -12,5 KHz
Additional current consumption micr. on: 6 mA ± 1 mA

Microphone channel
Nominal input level micr. : 85 dB S.P.L. ± 1,25 dB
Overload input level micr.: 110 dB S.P.L. ± 1,25 dB
Nominal output current : 0,41 mA
Gain reduction at overload input level: 18,5 dB ± 1,5 dB
Distorsion at nominal input level : < 0,5%
Distorsion at overload input level : < 5%
Frequency response (without micr. gain rel to 1 KHz) : 40 Hz : -10 ± 2 dB
150 Hz : -1,5 ± 1 dB
12,5 Hz : -0,5 ± 1 dB

Equivalent noise input : < 32 dB (A) S.P.L.

### External microphone

Nominal input level (without micr.) : -39 dB
Adjustment range : ± 4 dB
Input impedance at nominal level : 240 K - ± 5%
Electret voltage : 9V ± 1V
Electret drain resistor : 5 K6 ± 5%
Led current : 3,5 mA ± 0,5 mA

### Table top equipment

| | |
|---|---|
| LBB 3350/00 | Delegate unit with loudspeaker |
| LBB 3450/00 | Delegate unit without loudspeaker |
| LBB 3351/00 | Chairman unit with loudspeaker |
| LBB 3451/00 | Chairman unit without loudspeaker |

### Interconnection facilities

1. A cable (l=180 cm) with 8-pole male DIN connector for connection to the preceding delegate unit or to the central equipment e.g. LBB 3300/00.
2. A 8-pole female DIN socket for connection of the next delegate unit (loop-through).
3. A concentric 3,5 mm jack for connection of aux. equipment.

### Electrical specification

Supply voltage : 20 - 28 V
Supply current (stand by) : del. unit typ 8mA; chairman's unit typ 7mA
Frequency range : 150 Hz - -12,5 KHz
Additional current consumption micr. on: 6mA ± 1mA

### Microphone channel

Nominal input level micr. : 85 dB S.P.L. ± 1,25 dB
Overload input level micr. : 110 dB S.P.L. ± 1,25 dB
Nominal output current : 0,41 mA
Gain reduction at overload input level : 18,5 dB ± 1,5 dB
Distorsion at nominal input level : < 0,5%
Distorsion at overload input level : < 5%
Frequency response (without micr. gain rel 1KHz) : 40 Hz : -12 ± 2 dB
150 Hz : -1,5 ± 1 dB
12,5 Hz : -0,5 ± 1 dB
Equivalent noise input : <32 dB (A) S.P.L.

### Loudspeaker amplifier

Input impedance : > 1M
Gain : 20,75 dB ± 0,75 dB
Distorsion at Vo +19 dB : < 1,5%
Frequency response rel 1KHz: 150 Hz : -1 ± 0,75 dB
12,5 Hz : -2 ± 0,75 dB
Equivalent input noise level: < -89,5 dB
Rate load impedance : 150 E

Loudspeaker sound pressure : 75 ± 2 dB S.P.L. at 0,5 m and -12 dB input
(only LBB 3350 and LBB 3351)

### Interconnection cables

#### LBB 3305/00

Extension cable for table top and flush mounting units.
Cable : 8-pole brown standard cable.
Connectors : male and female 8-pole DIN, no lock.
Length : 5 meters

### LBB 3203 M.D.B. (Monitor Distribution Board)

#### 1. General

The M.D.B. contains nine amplifiers. Eight amplifiers are used to drive 8 lines for wired distribution, one of them is used as a monitor amplifier and this one can select one of the eight channels by a remote controlled electronic switch. The amplifiers are protected against short circuits.

#### 2. Interconnection facilities

A 96-pole male Eurocard connector.

#### 3. Electrical specifications

##### 1. General

Supply voltage : 27 V ± 0,5 V
Current consumption : typ 80 mA. max. 160 mA (stand-by)
Frequency range : 150 Hz - 12,5 kHz
All outputs are protected against short circuits.

##### 2. Channel amplifier

Input impedance (B10-A11) : > 20 K
Output impedance : < 10 E
Load impedance : > 50 E
Gain 500 Hz : 32 dB ± 0,5 dB
Gain freq. response : 150 Hz, -0,5 ± 1 dB
(rel. 500 Hz) 12,5 kHz, -0,5 ± 1 dB
Eq. noise input voltage : < -114 dB (A)
Distorsion $V_1$ = -9 dB : < 0,2%
$V_0$ max.

(d = 5%, f = 500 Hz) : > +24,5 dB

### 3. Monitor amplifier

Input impedance comm. input (A31-B31) : > 7 K6
Input impedance comm. input (A32-B32) : 200 K ± 5%
Input imp. (C18-C19) : > 10 K
Output imp. (C16-C17) : < 10 E (500 Hz - 12,5 kHz)
Gain:
- channel output > to mon. output (C16-C17) : 0 dB ± 1 dB (200 E resistor between A 31 and B31)
- Comm. input (A32-B32) to mon. output (C16-C17) : 3,5 ± 0,5 dB
- input (C18-C19) to mon. output (C16-C17) : 32 ± 0,5 dB (200 E resistor between A 31 and B31)
- comm. input (A31-B31) to mon. output (C16-C17) : 32 ± 0,5 dB

Gain freq. response (rel. 500 Hz) : 150 Hz, -3,5 dB ± 1 dB
12,5 Hz, 0 dB ± 0,5 dB
Eq. noise input voltage (C18-C19) : < -109 dB (A)
Distortion $V_o$ = +22 dB : < 0,2%
$V_o$ max. (d = 5%, f = 500 Hz) : > +24,5 dB

## LBB 3221/00 - 6-channel interpreter desk

### 1. General

This desk provides the speak and listening facilities for interpreters using the CCS400 system. Systems with up to 8 channels (including floor and autofloor channel) can be built with it.

### 2. Controls and indicators

- 6 locked push buttons
- 1-non-locked push button
- 1 three-position tumbler switch
- 1 two-position tumbler switch
- 1 8-position rotary switch
- 1 volume control
- 1 tone control
- 1 6-position rotary switch (rear side)
- 1 2-position slide switch (rear side)

### 3. Interconnection facilities

- A cable (l = 180 cm) with 25-pole male lockable D-connector for connection to the C.S.U. LBB 3300.
- A 25-pole female D-connection to connect to the next LBB 3221.
- A 6,3 mm jack for the connection of a microphone.
- A 6,3 mm jack for the connection of a headphone.

# 4. Electrical specification

1. General
Supply voltage : 24 - 27 V
Supply (stand by) current : typ. 42 mA, max. --- mA.

2. Microphone channel
Frequency range : 150 Hz - 12,5 kHz
Input level microphone : nom. 85 dB SPL
max. 110 dB SPL
Equiv. noise input level : < 35 dB (A) SPL, typ. 32dB(A)
Output impedance : 1250 E ± 15%
Load impedance : 200 E with center tap biased to 13.5 V with 3 K series-resistor
Output voltage : nom. -4 dB ± 1 dB
max. -3 dB ± 1 dB

3. External microphone input :
Input impedance : > 90 K
Nominal input level : -36,5 ± 4 dB (dependant of the setting of R4)
Gain frequency response : 40 Hz-14 ± 3 dB
(rel. 500 Hz) : 150 Hz-1.5 ± 1 dB
12,5 Hz-0,75 ± 1 dB
Distortion at input level : < 0,2% (nominal +25 dB).

When the microphone is switched off then the selected channel automatically receives the floor language.

4. Floor relay amplifier
Input impedance : 24 K ± 5%
(X1-1 --- X1-14)
Gain : -5 ± 1 dB
Gain freq. response : 150 Hz -1,5 ± 0,5 dB
(rel. 500 Hz)

5. Headphone amplifier
Input impedance : > 5 K
Output impedance : 500 E ± 5%
Gain (volume control max., pres. control min., unloaded) : 31,75 ± 1 dB
Eq. noise input voltage : < -99 dB(A) ($R_S$ = 200 E)
Distortion $V_O$ + 10 dB : < 0,5% (RL = 150 E)
Presence frequency : 4000 Hz ± 400 Hz
Extra gain at pres. freq. : > 8 dB

## System electro acoustical characteristics

If no tolerances are stated than the values are indicative.

Automatic microphone switch off circuitry
attack level : 64 dB SPL ± 3 dB
for one additional nominal speaker (85 dB SPL) : < 80 dB(A) SPL
time delay for each speaker : 40 ± 20 seconds
Automatic gain reduction
for two or more microphones on : -3 dB ± 1 dB
Power consumption passive delegate unit T.T. : 8 mA typ.
L.S. active delegate unit T.T. : = 11 mA
Micr. on delegate unit T.T. : = 30 mA

## Proporties of transmission links

In- and output levels are indicated in dB S.P.L. or dB rel. 0,775 V (unloaded). Output levels of loudspeakers are indicated at 0,5 m. distance.

### Interface data

|  | Link<br>A-C | <br>A-E | <br>A-G | <br>A-D | <br>A-H |
|---|---|---|---|---|---|
| Nominal input level | <------------All links 85 ------------> |  |  |  |  |
| Overload input level (500 Hz) | <------------All links 110------------> |  |  |  |  |
| Output impedance | 70..700E | N.A. | <1K | <10E | <200E |
| Permissible load impedance | >10K | N.A. | >10K | =>150E | >1K |
| Output level (input level between nom. and overload) (central gain pot. -3dB) | -9..+1 | +75..+85 | +5..+15 | +11..+20 | -4..+6 |

### Transfer data

|  | A-C | A-E | A-G | A-D | A-H |
|---|---|---|---|---|---|
| Gain reduction at O.I.L. (A.G.C.) | <-----------All links 16 dB ± 1 dB----> |  |  |  |  |
| Gain reduction no microphone on | <----------- 0 dB --------------------> |  |  |  |  |
| Gain reduction, 2 or more microphones on | <------All links 3 dB ± 0,5 dB-> |  |  |  | 0 dB |
| Range of attenuator for del. loudsp./headph. (± 1 dB | <--------0, -3, -6, -12, -15---> |  |  |  | 0 dB |
| Distortion at rated imp. | <1% | <3% | <1% | <1% | <1% |
| Distortion at max. imp. | <5% | <5% | <5% | <5% | <5% |
| Typical clipping level (distortion = 5%) | - | - | - | +11 dB | - |
| Eq. noise input level (A-weighted): typical: | <32 | <32 | <32 | <32 | <32 |

Interface data

| | Link | | |
|---|---|---|---|
| | A-I | A-L | A-J |
| Nominal input level | ---------------------> | | |
| Overload input level (500Hz) | ---------------------> | | |
| Output impedance | <50E | 510E/220K | <5E |
| Permissible load impedance | >1K | >0E | <50E |
| Output level | -16..-6 | -24 | +25...+30 |
| (input level between nom. | - 4..+6 | | |
| and overload) | + 6..+16 | | |
| (Central gain pot. -3dB) | | | |

Transfer data

| | | | |
|---|---|---|---|
| Gain reduction at O.I.L. (A.G.C.) | ---------------------> | | |
| Gain reduction no microphone on | ---------------------> | | |
| Gain reduction, 2 or more microphones on | 0 dB | 0 dB | 0 dB |
| Range of attenuator for del. loudsp./headph. (± 1 dB) | 0 dB | 0 dB | 0 dB |
| Distortion at rated imp. | <1% | <1% | <15% |
| Distortion at max. imp. | <5% | <5% | <30% |
| Typical clipping level (distortion = 5%) | - | - | +24,5 |
| Eq. noise input level (A-weighted): typical: | <32 | <32 | <32 |

Interface data

| | Link | | | |
|---|---|---|---|---|
| | C-H | F-H | I-E | C-E |
| Nominal input level | 0,41 mA | -4 dB and +6dB | -16,-4,+6dB | -4 dB |
| Overload input level (500 Hz) | 1,3 mA | +6 dB and +16dB | -6,+6,+16dB | +6 dB |
| Input impedance | 70-700E | >10K | 71K,24K,6K | >30K |
| Output impedance | <200E | <200E | N.A. | N.A. |
| Permissible load impedance | >1K | >1K | N.A. | N.A. |
| Output level | -4..+6 | -4..+6 | +75..+85 | +75..+85 |
| (input level between nom. and overload) | | | | |
| (Central gain pot -3dB) | | | | |

## Transfer data

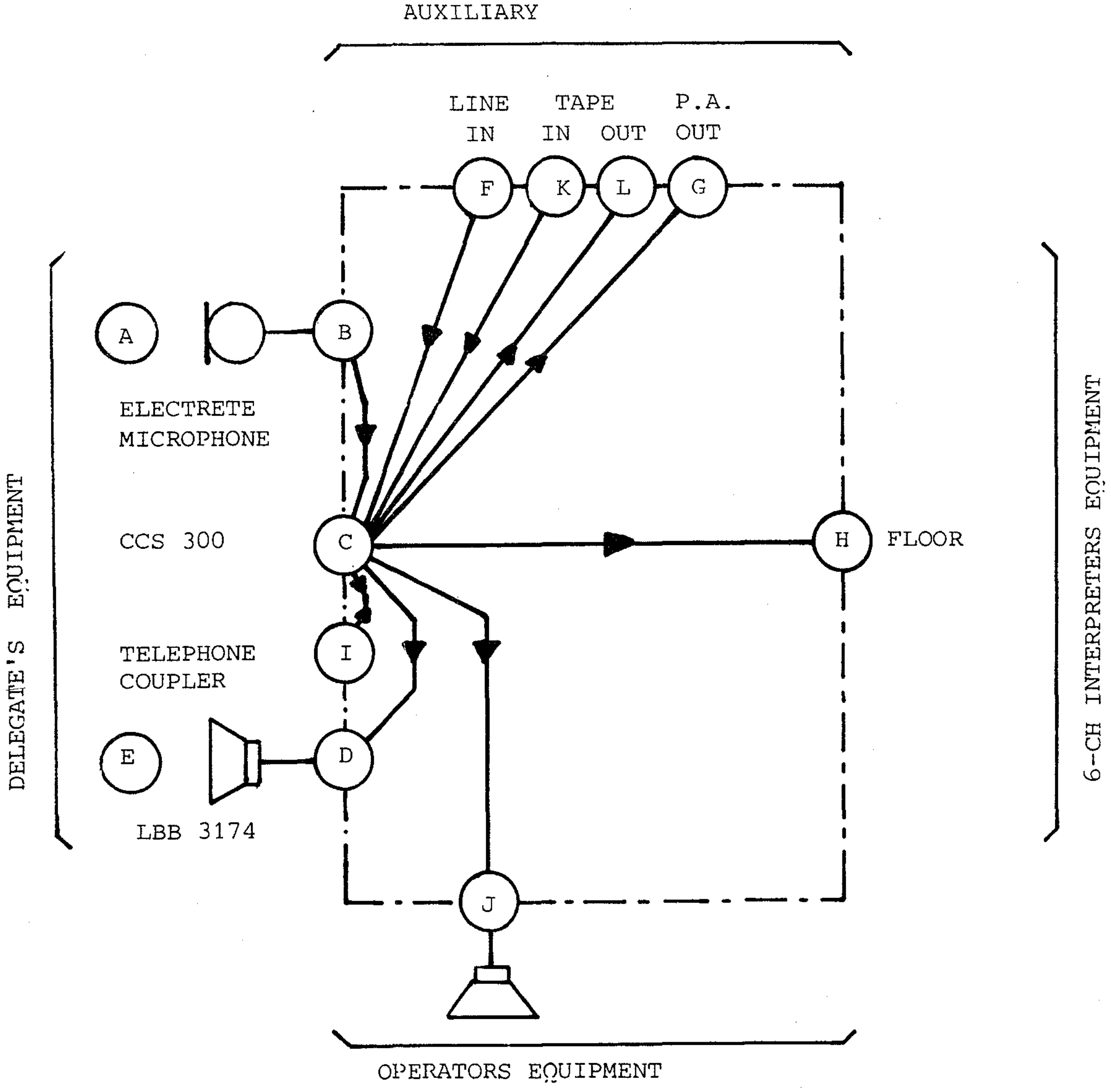
| | | | | |
|---|---|---|---|---|
| Gain reduction no microphone on | <----- 0 dB ---------------------------> | | | |
| Gain reduction, 2 or more microphones on | <----- 3 ± 1 -------------------------> | | | |
| Range of attenuator for del. loudsp./headph. | 0,-3,-6,-9,-12,-15 | | <3% | <3% |
| Distortion at rated imp. | <0.5% | <1% | <5% | <5% |
| Distortion at max. imp. | <2% | <5% | - | - |
| Typical clipping level (distortion = 5%) | +15dB | +9 dB | | |
| Eq. noise input level (A-weighted, 1 micr. on) | <0.41uA | <-64 | | |

Limits of the system

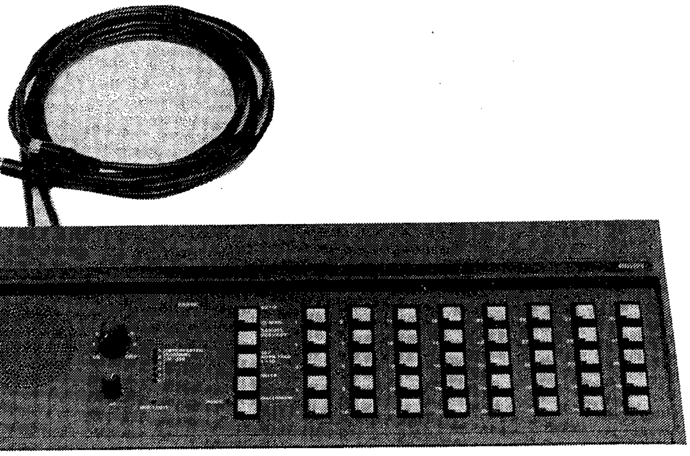
One LBB 3300/00 can feed two loop-through strings of 35 * delegate units with max. 50 meters extension cable each. In case of trunk cabling, the maximum length of each string is 100 meters (power core ∅ 0,75 $mm^2$).

Max. number of 6 channel interpreter desks LBB 3221 is 18 *.
Max. number of channel selectors LBB 3178 is 1000.

* Max. total continuous current ≤ 1,7 A (two strings and interpreters desks), and ≤ 1,55 Amp when LBB 3203 feeds 1000 channel selectors.


AUXILIARY
LINE IN
TAPE IN OUT
P.A. OUT
F
K
L
G
A
B
ELECTRETE MICROPHONE
CCS 300
C
H
FLOOR
TELEPHONE COUPLER
I
E
D
LBB 3174
J
DELEGATE'S EQUIPMENT
6-CH INTERPRETERS EQUIPMENT
OPERATORS EQUIPMENT

| | |
|---|---|
| LBB 3386/40 | CENTRAL CONTROL DESK, 40 DEL |
| LBB 3386/70 | CENTRAL CONTROL DESK, 70 DEL |
| LBB 3386/01 | CENTRAL CONTROL KIT,<br>BASIC PCB ASSEMBLY |
| LBB 3386/02 | CENTRAL CONTROL KIT,<br>EXTENSION PCB ASSEMBLY |



**CAUTION** FOR PREVENTING DIGITAL CIRCUITRY DAMAGE, USE DURING TESTING ONLY MEASURING EQUIPMENT WHICH IS NOT EARTHED !

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# 1 INTRODUCTION AND TYPENUMBERS

## 1.1 INTRODUCTION

In this document the CCS 400 Central Control equipment is described. The service policy is to maintain and repair this equipment at the customers site (mainly first line). Therefore the complete PCB assemblies, cable assemblies and mechanical assemblies are stocked as spare parts at concern service.

### 1.1.1 The Central Control Desk

The central control desk provides complete control over the CCS400 conference system. The desk gives the operator the means to control the on/off status of the delegates microphone units and to monitor the systems audio channels. It also provides an over-all view of the system status, including a request-to- speak list, active microphones and microphones to which a special status (AUTO-FREE) has been assigned, plus a facility for monitoring the interpretation channels.

Two desks are available, one for control up to 40 delegates, the LBB 3386/40, and the other for control up to 70 delegates, the LBB 3386/70. The LBB 3386/40 consists of one uP/switch board and one I/O/switch board. The LBB 3386/70 consists of one uP/switch board and two I/O/switch boards.

The desk includes 40 or 70 illuminated microphone control keys, each key corresponding to a single delegates microphone unit. A facility is also provided were up to a maximum of 5 delegates units out of 10 may be assigned with a special status (AUTO-FREE). The delegate units assigned with the special status allow their users to switch on or off their microphone units without any intervention by the system operator during conference proceeding.

The control desk provides two operational modes :

1) Automatic mode (AUTO)
Delegates may control the on/off status of their own microphones

2) Manual mode (MANUAL)
Delegates initially join a queue of waiting delegates who have requested to speak. Once in the queue the operator has full control over the on/off status of the microphone units.

For further functional description see "Discussion Conference and Interpretation system CCS400 Installation Manual and Operating Instructions for the Conference Application", 3922 988 20211.

## 1.1.2 The Central Control Kit

The central control kit has been designed and assembled for customers wishing to create and design their own custom built control desk. The kit provides complete control of the CCS 400 conference system for up to 10, 40, 70 or 100 delegate units.

The installation kit provides the means to arrange and position the control switches, used to control the delegates microphone units, and their respective led indications to any desired location on the custom built control desk. For example the geographic positions of the delegates microphone units in a conference hall may be represented on the control desk.

The central control kit is made up of two main PCB board assemblies :

- LBB 3386/01 basic PCB assembly
- LBB 3386/02 extension PCB assembly

The basic PCB assembly LBB 3386/01 allows control up to 10 delegates units, together with facilities for system monitoring and microphone management. An extension to the basic PCB assembly is provided by the extension PCB assembly LBB 3386/02 capable of controlling up to a further 30 delegate units.

The following configurations can be made :

| | |
|---|---|
| configuration 1 : | 1 x LBB 3386/01 provides central control for up to 10 del. units. |
| configuration 2 : | 1 x LBB 3386/01 and 1 x LBB 3386/02 provide central control for up to 40 del. units. |
| configuration 3 : | 1 x LBB 3386/01 and 2 x LBB 3386/02 provide central control for up to 70 del. units. |
| configuration 4 : | 1 x LBB 3386/01 and 3 x LBB 3386/02 provide central control for up to 100 del. units. |

**NOTE** This is the maximum configuration which is possible with the kit. This "maximum" is mainly determined by the software.

The basic PCB assembly LBB 3386/01 consist amongst others of an assembled microprocessor/switch PCB. This PCB is functionally and electrically similar to the uP/switch board of the LBB 3386/40/70 (description in chapter 4 and 5) with the exception of the leds and pushbuttons. Where on the uP/switch board of the /40/70 the leds and buttons are mounted, connectors are placed on the /01 board to make it possible to connect leds and buttons at remote positions for special applications. The extension PCB assembly LBB 3386/02 consist amongst others of an assembled switch PCB. This PCB is similar to the I/O/switch board of the LBB 3386/40/70 (description in chapter 4 and 5), functionally as well electrically. As on the uP/switch board of the /01, the leds and pushbuttons are replaced by connectors.

For description of how to use the installation kit, see installation manual 3922 988 20111.

## 1.2 TYPENUMBERS

| | |
|---|---|
| LBB 3386/40 | Central Control Desk for up to 40 del. units |
| LBB 3386/70 | Central Control Desk for up to 70 del. units |
| LBB 3386/01 | Basic PCB assembly of central control kit |

This assembly consists of the following :

- 1 x assembled microprocessor/switch board
- 2 x cable relief grommet
- 2 x trunk line
- 1 x headphone socket and nut
- 1 x loudspeaker and mounting plate
- 1 x 8-pole rotary switch (monitor)
- 2 x knob + cap
- 1 x potentiometer 47 Kohms
- 12 x cable (4 core) with 4-pole connector for switch (push button) and led
- 19 x cable (2 core) with 2-pole connector for led
- 3 x cable (2 core) with 2-pole connector for switch (push button)
- 1 x cable (11 core) with connector for monitoring interpretations
- 1 x cable (2 core) with connector for loudspeaker connection

LBB3386/02 Extension PCB assembly of central control kit.

This assembly consists of the following :

- 1 x assembled switch board
- 30 x cable (4 core) with 4-pole connector for switch (push button) and led

## 2 TECHNICAL DATA

The functional specification/description can be found in the CCS400 Installation manual 3922 988 20211.

**NOTE** Where "see spec. section13" is mentioned, the electrical specification, which is included in section 13, is meant.

## 2.1 GENERAL TECHNICAL SPECIFICATION

### 2.1.1 6.3mm Socket For Headphone

Output level at nominal input level (85 dB S.P.L. at system microphones) : > +22 dB (electrical)
(at least 22 dB with rotary volume control at minimum)

Output impedance : 680 Ohm.

### 2.1.2 Monitor Part

Monitor amplifier :

frequency response : 150 Hz - 12,5 KHz

Monitor loudspeaker :

Output level at nominal input level (85 dB S.P.L. at system microphones) : > 80 dB S.P.L., at 0,5m !!

Total Harmonic Distorsion : < 2%

### 2.1.3 Rotary Volume Control For Loudspeaker/Headphone Level

adjustment range : 27 dB (electrical)

### 2.1.4 Mute Function

attenuation when mute is active : > 20 dB

### 2.1.5 Battery Back Up

data retention time at least 500 hours. (battery completely charged).

### 2.1.6 Checksum Of EPROM

The checksum of the EPROM is 3CC5.

2.1.7 Response Time at desk actions in the CCS400 system is < 0,33 sec.

## 2.2 INTERFACE SPECIFICATION

### 2.2.1 8-poleDIN connector for connection to DEL1 socket on C.S.U.

(in circuit diagram ST1).

| contact | function | specification |
|---|---|---|
| 1,2,3,4,5,6 | N.C. | |
| 7 | V+ del. units | see spec. section13 |
| 8 | ground del. units | see spec. section13 |

### 2.2.2 8-pole DIN connector for connection to DEL2 socket on C.S.U.

(in circuit diagram ST2).

| contact | function | specification |
|---|---|---|
| 1 | Priority output | no priority : < 0,1mA<br>priority : > 0,5mA |
| 2 | N.C. | |
| 3 | Audio (floor) | see spec. section13 |
| 4 | Audio ground<br>("Auto switch off" | see spec. section13<br>on/off) |
| 5 | V+ for control desk | see spec. section13 |
| 6 | N.C. | |
| 7 | V+ del. units | see spec. section13 |
| 8 | ground del. units | see spec. section13 |

### 2.2.3 8-pole female DIN sockets BU1 & BU2

For connection of Del string1 respectively Del string2

| contact | function | specification |
|---|---|---|
| 1 | Priority output | no priority : V > 20V<br>priority (AUTO and MANUAL) : 9V < V < 14V |
| 2 | Disable request output | Disable : V < 9V<br>Enable : V > 11V |
| 3 | Audio (floor) | see spec. section13 |
| 4 | Audio ground<br>("Auto switch off" | see spec. section13<br>on/off) |
| 5,6 | N.C. | |
| 7 | V+ del. units | see spec. section13 |
| 8 | ground del. units | see spec. section13 |

### 2.2.4 8-pole female DIN socket BU3

For connection of chairmans unit

| contact | function | specification |
|---|---|---|
| 1 | Priority input | priority : V < 3,5V<br>non-priority : floating |
| 2,5 | N.C. | |
| 3 | Audio (floor) | see spec. section13 |
| 4 | Audio ground | see spec. section13 |
| 6 | Remote control | mic. off : V= 15V +/- 1V<br>mic. on : V= 5,5V +/- 1V |

| | | |
|---|---|---|
| 7 | V+ del. units | see spec. section1 |
| 8 | ground del. units | see spec. section13 |

### 2.2.5 6-pole female DIN socket BU4

For connection of external power supply unit (if required)

**NOTE** This "extra" power is only used by the central control desk hardware and not by the connected delegate units.

| contact | function | specification |
|---|---|---|
| 1,3 | ground | |
| 2 | V+ input | 28V +/- 1V<br>continuous outp. current<br>> or equal to 0,3A<br>continuous short circuit<br>current < or equal to 0,5A |
| 4,5,6 | N.C. | |

### 2.2.6 15-pole female D-type connector socket BU6

For connection of the C.S.U.- or transmitter- monitor socket A monitor cable LBB 3024/02 must be used between BU6 and C.S.U. or transmitter.

| contact | function | specification |
|---|---|---|
| 1,9 | Monitor signal input | see spec. section13 |
| 2 | led input ch6 | current 2,5 mA +/- 10% |
| 3 | led input ch4 | " " " " " " |
| 4 | led input ch2 | " " " " " " |
| 10 | led input ch3 | " " " " " " |
| 11 | led input ch5 | " " " " " " |
| 12 | led input ch1 | " " " " " " |
| 5,6 | common led input | ground |
| 7 | output A1 | logical 0 : floating<br>logical 1 : 5V |
| 8 | output A3 | connected to pin 13 (5V) |
| 14 | output A0 | see 7 |
| 15 | output A2 | see 7 |
| 13 | common input | +5V |

2.2.7 25-pole female D-type connector sockets BU7 (del. 1-10), BU1 (del. 11-20), BU2 (del. 21-30), BU3 (del. 31-40), BU1 (del. 41- 50), BU2 (del. 51-60), BU3 (del. 61-70), BU1 (del. 71-80), BU2 (del. 81-90) and BU3 (del. 91-100). BU1, BU2 and BU3 are mounted on the I/O switch board. (1 x in /40, 2 x in /70, 1,2 or 3 x as /02 in central control kit).

For connection of the delegate units for remote control

remote control input pins : input impedance : > 30K
input floating : no request
input < 5V : request
remote control output pins : pulse amplitude : 24 V +/- 2V

rise time (del. on): < 0,5 m
fall time (del.off): < 0,5 ms
maximum load : 12 nF

| Input/output pins off connected delegates | IN pin | OUT pin |
|---|---|---|
| 1, 11, 21, 31, 41, 51, 61, 71, 81, 91 | 5 | 17 |
| 2, 12, 22, 32, 42, 52, 62, 72, 82, 92 | 4 | 18 |
| 3, 13, 23, 33, 43, 53, 63, 73, 83, 93 | 3 | 15 |
| 4, 14, 24, 34, 44, 54, 64, 74, 84, 94 | 2 | 16 |
| 5, 15, 25, 35, 45, 55, 65, 75, 85, 95 | 1 | 14 |
| 6, 16, 26, 36, 46, 56, 66, 76, 86, 96 | 10 | 23 |
| 7, 17, 27, 37, 47, 57, 67, 77, 87, 97 | 9 | 21 |
| 8, 18, 28, 38, 48, 58, 68, 78, 88, 98 | 8 | 22 |
| 9, 19, 29, 39, 49, 59, 69, 79, 89, 99 | 7 | 19 |
| 10,20, 30, 40, 50, 60, 70, 80, 90, 100 | 6 | 20 |

## 2.3 SYSTEM CONDITIONS

### 2.3.1 Working Conditions

- fixed/stationary/transportable
- indoor use
- operation by experts/laymen
- climate : +5/+40 C

### 2.3.2 Storage And Transport

- packed according to UND 1400
- transport conditions : -40/+70 C

### 2.3.3 Safety Requirements

- IEC 65, SEMCO, DEMCO, NEMCO, BS415

### 2.3.4 Interference

- The radiation according to CISPR catagory II
- The susceptibility for mains interference : the equipment can be used in industrial areas.
- The susceptibility for electromagnetic interference : a field of 1V/m, 30 % modulation (AM), frequency between 0-500 Hz, gives an interference of < 40 dB related to the nominal output level.
- The susceptibility for static discharges on all touchable partson the outside of the equipment does not cause any damage of parts or non-self-resetting disturbing functions.

### 2.3.5 Other Legal Requirements

- cadmium is not present in components or as metal protection.

## 2.4 QUALITY/RELIABILITY SPECIFICATION

### 2.4.1 Technical Lifetime

- The total lifetime required is > 7 years.

### 2.4.2 Reliability

- Mean Time Between Failures (M.T.B.F.) : 50.000 Hrs
- Mean Time To Repair (M.T.T.R.) : 30 min. 1st line
  90 min. 2nd line

## 2.5 QUALITY TESTS

### 2.5.1 Temperature

- operating : - dry heat acc. to IEC 68-2-2B, +45 C
  - dry cold acc. to IEC 68-2-1A, +5 C
    at these temperatures the products will fulfill the specification data.

- storage and transport :
  - test acc. to IEC 68-2-1A and 96 hours at +70 C acc. to IEC 68-2-2B.

### 2.5.2 Relative Humidity

- cyclic damp heat test acc. to IEC 68-2-30Db; 21 days in 40 C

### 2.5.3 Bump

- Test acc. to IEC 68-2-29Eb; 3 directions, 1000 bumps of each 10g (gravity).

### 2.5.4 Vibration

- tested acc. to IEC 68-2-6Fc, procedure A;
  1) vibration between 10 and 60 Hz, vibration amplitude 0,35mm, gravitational force variable.
  2) vibration between 60 and 150 Hz, gravitational force 5g, vibration amplitude constant.

tests in 3 directions, 30 min/direction (without resonance test)

### 2.5.5 Transport

- droptest acc. to UND 1400 with packed product.

### 2.5.6 Susceptibility To HF(see 2.3.4)

- tested acc. to ELV 14-204

### 2.5.7 Conducted And Radiated Interference

- acc. to CENELEC/CISPR, catagory II

### 2.5.8 Spikes On The Mains

- tested with Koepfer generator SG242
  400V spikes will give no noticeable disturbance.
  800V spikes will not cause defects.

### 2.5.9 Safety

- safety acc. to IEC 65

## 3 TEST INSTRUCTIONS

The following test instructions are to test the central control equipment functionally. For composing a CSS 400 conference system (this also includes central control equipment) see installation manual 3922 988 20211. This chapter is referred to in chapter 5 of the above mentioned installation manual.

1) Switch on the mains supply on the Central Supply Unit (C.S.U.)

2) Check that the "mains on" indicator on the central control desk is illuminated.

3) Adjust the monitor gain control on the control desk to the required listening level.

4) Put the control desk into the "MANUAL" mode, i.e. press the key marked "AUTO MAN" until it illuminates.

5) Press in chronological order the microphone on/off buttons of the delegate units assigned with numbers 1-10. Check that the green LED on the units illuminate.

6) At the control desk the illuminated keys corresponding to the first ten delegate units 1-10 should now be illuminated and flashing. The key marked no.1 which corresponds to the delegate unit assigned no.1 should now be flashing at twice the speed of the other keys marked 2-10.

7) At the control desk press the corresponding illuminated keys to switch on the microphones of the delegate units 1-10.

   **NOTE** At this stage it is assumed that no "AUTO FREE" status has yet been assigned. Therefore the first seven microphones (the CCS 400 system is limited to 7 active microphones plus the chairmans microphone) should now be activated.

8) After pressing the illuminated keys 1-10 on the control desk, check that the delegate unit microphones 1-7 are active and their corresponding red leds on the unit themselves are illuminated and the corresponding keys on the control desk are now permanently illuminated.
   Check that the loudspeakers of the corresponding units are switched off.
   If necessary adjust the system gain to the required listening level free from acoustic feedback, by means of the rotary switch on the C.S.U.

9) The "MIC. LIMIT" led on the control desk should now be illuminated indicating that the limit of the system has now been reached. In such a case it will be unable to switch on any more microphones.

10) Switch off the active delegate microphone units either by pressing again the corresponding keys on the control desk, or by pressing again the microphone on/off button on the microphone units themselves.

11) At the control desk the keys marked 8,9 and 10 should still be illuminated and flashing.
Key eight should be flashing at twice the speed of keys 9 and 10.

12) At the control desk press the corresponding illuminated keys to switch on the microphones of the delegate units 8,9 and 10. Check the units for correct operation as above.

13) Depending on the number of delegate units installed in the system repeat steps 5 to 12 for delegate units numbered 11-20, 21-30, 31-40, etc to 91-100.

14) Check the "CANCEL REQUEST" function on the control desk by first making a number of requests to speak by pressing the microphone on/off buttons on the delegate units.
The keys corresponding to the delegate units on the control desk which have requested to speak will now be flashing. Press the key marked "CANCEL REQUEST" on the control desk, this should now extinguish all the illuminated flashing keys together with the green leds on the corresponding delegate units.

15) To check the chairmans unit, press the key marked "CHAIRMAN" on the control desk to switch on the chairmans microphone. The key will illuminate together with the red led on the chairmans unit. To switch off the chairmans unit, press again the key marked "CHAIRMAN". The illuminated key will now extinguish together with the red led on the unit itself.

16) To check the chairmans priority function, keep the key marked "PRIORITY" on the chairmans unit pressed. A chime tone should be heard, and the led marked "PRIOR" on the control desk should illuminate and the chairmans microphone should now become active, and all active microphones become temporarily muted.

17) When the "PRIORITY" key is released the microphones which were temporarily muted, should now become active again. The red led marked "PRIOR" will extinguish.

18) To check the mute function, activate a number of delegate units and press the key marked "MUTE" on the control desk. When pressed the floor distribution should now be muted.

19) To check the "AUTO FREE" status assign the delegate units numbered 1-5 with the auto free status. This is achieved by keeping the key marked "SET AUTO FREE 1-10" on the control

desk pressed, while selecting keys 1 to 5. When selected the corresponding green leds will illuminate.

20) When selected for "AUTO FREE" status, the assigned units may be switched on or off at any time by pressing the units microphone on/off buttons. However the assigned units may also be switched on or off at the control desk. Check this function.

21) Repeat steps 19 and 20 for delegate units 6 to 10.

22) To check the system in the "AUTO" mode, press the key marked "AUTO MAN" on the control desk, until the illuminated key extinguishes. In the "AUTO" mode delegates control their own microphones.
However, as previously stated, the CCS 400 system is limited to 7 active microphones plus the chairmans microphone. Press the on/off button of the delegate units numbered 1-7, they should now become active automatically until the MIC. LIMIT led illuminates. Check that after a repeat operation of the units on/off buttons the units are now switched off.

## 4 BLOCK DIAGRAM DESCRIPTION

The central control desk can be divided into 15 parts (see block diagrams fig. 1,2,3 and 4). These 15 parts are divided over 2 main PCB's, the uP/switch board 3922 156 06560 (in control desk) or /01 (in control kit) and the I/O/switch board 3922 156 06550 (in control desk) or /02 (in control kit).

### 4.1 PART 1 MICROPROCESSOR Z80

The Z80 uP controls the data uplink and data downlink part. It ensures that the leds of the desk buttons are switched on or off via the data downlink part at the correct time. The processor also provides data to switch on or off the delegate and chairman microphones. Via the uplink part requests from delegates and information from the desk buttons are read in by the processor. Via the address bus the RAM and ROM can be addressed. Via the data bus, data is send to the RAM, the UART or to the data downlink converter. Data can be read in from the RAM, ROM, UART, the address latch and the data uplink converter.

### 4.2 PART 2 CLOCK GENERATOR

The Clock generator part provides the uP clock and a serial and latch clock to control the data downlink and data uplink part. From the serial clock a CLK1 and CLK2 signal is derived to control the I/O part.

### 4.3 PART 3 POWER SENSE AND RESET CIRCUIT

This circuit senses the power supply voltage. When the system is switched on, a reset to the uP, RAM and IC18 (latch) will be generated. The circuit also contains a watchdog timer. This timer will reset the processor, RAM and IC18 in case the uP has "hung up" The watchdog reset circuitry can be made inactive by placing jumper S21.

### 4.4 PART 4 DATA UPLINK AND DATA DOWNLINK CONVERTER

The data downlink converter converts the parallel data from the uP into serial data for the I/O part to be sent to the delegate units to control the microphones, and to the desk button circuitry to control the leds. The data uplink converter converts the serial data, coming from the desk buttons and delegate requests via the I/O part, into parallel data for the uP.

### 4.5 PART 5 CONTROL CIRCUITRY

This part controls the memory (RAM & ROM), the UART, the reset circuit and finally the data uplink- and data downlink converters. It also provides load and strobe pulses for the I/O part.

## 4.6 PART 6 MEMORY

The ROM contains the uP program. The RAM contains program variables and is used to store temporary data. The RAM has a battery back-up.

## 4.7 PART 7 SERIAL INTERFACE

**NOTE** This is an optional circuit.

This circuit contains an UART for serial communication with e.g. a Personal Computer.

## 4.8 PART 8 DATA DOWNLINK FOR DESK BUTTON LEDS

In this part serial data from the data downlink converter is converted into data to control the desk button leds. The circuit is controlled by CLK1 and STROBE1.

## 4.9 PART 9 DATA UPLINK FOR DESK BUTTON INFORMATION

In this part data from the desk buttons is converted into serial data for the data uplink converter. The circuit is controlled by CLK2 and inverted LOAD1.

## 4.10 PART 10 DATA UPLINK FOR DELEGATE REQUEST INFORMATION

In this part data from the delegate request buttons is converted into serial data for the data uplink converter. The circuit is controlled by CLK2 and inverted LOAD2.

## 4.11 PART 11 DATA DOWNLINK FOR DELEGATE MICROPHONES

In this part serial data from the data downlink converter is converted into data to control the delegate microphones. The circuit is controlled by CLK1 and STROBE2.

## 4.12 PART 12 PRIORITY/DISABLE REQUEST CONTROL CIRCUIT

Via this circuit the priority signal from the chairman is connected to the data uplink circuitry in part 10. A priority signal, to activate the chime tone, which is coming from part 11, is distributed to the delegates and the Central Supply Unit. Disable request, activated by part 11, is connected to the delegates.

## 4.13 PART 13 CHANNEL MONITORING

In this circuit the monitor signal or the floor is selected via a multiplexer. Via this part the channel address selected by the channel selector is routed to the M.D.B. (Monitor Distribution Board) or transmitter via BU6. The selected channel is received as the monitor signal. Volume control is provided by a potentiometer which can be controlled at the front of the desk.

## 4.14 PART 14 VOLTAGE CONVERTER

In this part several voltages used in the circuitry, are derived from the power supply voltage coming from the Central Supply Unit and/or the external supply unit. A rechargeable battery ensures Vbat. for e.g. the RAM when the system is switched off or in case of a power failure.

## 4.15 PART 15 CHANNEL OCCUPIED INDICATION

This circuit ensures that a led will illuminate when the corresponding channel is occupied. The channel occupied information, available on BU6, is taken from the Monitor connector at the Central Supply Unit or at the IR transmitter.

# 5 CIRCUIT DESCRIPTION

## 5.1 AUDIO PART

This part is located on the uP/switch board 3922 156 06560 (in control desk) or on /01 (control kit)

See circuit diagram fig. 6

### 5.1.1 Power Supply

Via pin 3 and pin 4 of DELII (ST2) the floor line from the C.S.U. (Central Supply Unit, LBB 3300/--) is connected to the Chairmans connector (BU3-3,4), to delegate string 1 (BU1-3,4) and to delegate string 2 (BU2-3,4). The power supply voltage coming from the C.S.U. via ST2-7,8 and ST1-7,8 is used by the chairman (BU3-7,8) and delegate string 2 (BU2-7,8) respectively by delegate string 1 (BU1-7,8). The voltage y-z is made from the power supply voltage from DELII (ST2) and/or from the voltage coming from an external power supply. Y is 26,5 V and Z is earth (mechanical ground). From this voltage y-z, the voltage Vdd is derived, with Vss as ground reference. Vdd is used for all digital IC's.

**NOTE** Vdd is 26,5 V in relation to earth (mechanical ground). Vss is approx. 21 V in relation to earth. This means that Vss is not mechanical ground but a ground reference for the digital circuitry. When using measuring equipment which is earthed, it is possible that 26,5 V will be present at the digital circuitry. Therefore :

**CAUTION** For preventing digital circuitry damage, use during testing only measuring equipment which is not earthed.

The resistor circuitry R164-R168 divides the power voltage coming from ST2-8 or from the external power supply, into the following voltages, V++, +13V, +5V and +2,5V. These voltages are used in the monitor part (circuitry around IC31 and IC32).

### 5.1.2 Monitoring

The circuitry around and including IC31 ensures that the monitored channel (coming from the M.D.B. in the C.S.U., or from an IR transmitter) or the floor is switched to the loudspeaker amplifier. When via the monitor cable a M.D.B. or IR transmitter is connected, 5V is supplied to the select inputs of the mux. IC31. By means of the channel selector any channel including floor and autofloor can be monitored. When no M.D.B. or IR transmitter is used monitoring of the channels is not possible. The select inputs of the mux. are now low and therefore the floor is always switched through independent of the channel selector position.

### 5.1.3 Channel Occupied Indication

On BU6-2,3,4,10,11 and 12 the channel occupied information for the leds, coming from the int/mon board in the C.S.U. (directly or indirectly via a connected IR transmitter), is available. The channel occupied leds are connected between the info pins on the connector BU6 and the ground reference pin BU6-6. When a channel is occupied the corresponding op-amp on the int/mon board will have an high output of 27V ensuring that current can flow through the led to ground. The led will illuminate.

### 5.1.4 Loudspeaker/Headphone Amplifier

The op-amp IC32 together with TS11, TS12, TS13 and TS14 and surrounding components form the power amplifier for the loudspeaker and headphone. Volume control is possible with the 47K potmeter connected to X4-2,3. The loudspeaker will be switched off when a headphone is plugged in. IC32 is amplifying the signal and the resistors and capacitors determine the amplification rate and the bandwith. The transistors TS11, TS12, TS13 and TS14 provide enough current to drive the loudspeaker.

Switch button S2 can be used for muting the floor signal.

## 5.2 MICROCOMPUTER PART

his part is located on the uP/switch board 3922 156 06560 (in control desk) or on /01 (control kit).

See circuit diagrams fig. 7-1 through 7-4 and fig. 11-1 through 11-4.

The microcomputer part roughly consist of the Z80 uP, RAM, ROM, control circuitry and an optional serial interface part for e.g. PC connection.

### 5.2.1 Reset Circuitry

#### 5.2.1.1 Power Sensing

The circuitry consisting of TS1, TS2, TS3 and associated components is sensing the voltage Vdd. As long as the power supply voltage is not in range, less than approx. 6V, the set (4) input of IC15a (emitter of TS3) is active low because Vdd is lower then 6V. The inverted Q output (6) is low and the uP, RAM and IC18 are in reset. The Q output (5) is high and no current can flow through D4 to ground, therefore the "power on" led will not be illuminated. When the power supply voltage is in range, greater than approx. 6V, the set input of IC15a becomes high and therefore inverted Q output is no longer low (uP, RAM and IC18 no longer in reset), but is dependent of the C1 (3) and 1D (2) inputs of IC15a. The Q output is high, current can flow through the "power on" led D4 to ground and the led will illuminate.

### 5.2.1.2 Watchdog timer.

When the power supply voltage is in range (>6V), the MR input 11 of counter IC14 is low via inverter IC13d. Normally pin3 of IC24a is high (not addressed by uP) and therefore pin6 of IC13C, which is connected with MR, is low. The counter is normally counting. The uP, which is running in normal situation, takes care that at regular intervals pin3 of IC24a is addressed, pin3 then becomes low Via pin6 of IC13c and C7 a positive pulse is generated at the MR input of IC14. The counter will be reset and starts counting the incoming clockpulses at pin10 again. The interval frequency is chosen so that the output 14 of IC14 never reaches the high state. Every time before output 14 of the counter will turn high (after 512 clockcycles), the counter will be resetted by the MR pulse. In this way output 14 will remain low as long as the uP generates via IC24a, pin3 and IC13c/C7 the MR pulse at the proper time. Pin 9 of the counter, which is connected with C1 input of IC15a, ensures that the low 1D input (output 14 of IC14) is clocked to the outputs. Q is low, led D4 will illuminate. Inverted Q output is high, the uP, RAM and IC18 are not in reset. When the uP has hung up itself pin3 of IC24a will not be addressed at the proper moment, via IC13c/C7 the MR input remains low. The counter will not be reset at the regular intervals and therefore it continues to count incoming clockpulses. Output 14, 1D input of IC15a, will become high (after 512 clockcycles) and therefore inverted output Q becomes low. The up, RAM and IC18 will be reset now.

### 5.2.2 Microprocessor

The reset output of the power sense/watchdog circuit is connected to the active low RESET input ensuring that, when the system is switched on, a powerfailure occurs or when the processor has hung up itself, the uP will be reset. A0/A15 of the Z80 form the address bus providing the addresses for the memory and I/O. D0/D7 forms the bidirectional data bus. The in- verted outputs M1, RFSH, HALT and BUSACK are not used. The inverted inputs WAIT and BUSREQ are also not used and therefore connected to Vdd. The inverted INT input is used by a clock signal coming from IC22 ensuring that the uP is interrupted at regular intervals. Every time the inverted INT is low the uP diverts to an interrupt program controlling the delegates and desk buttons/leds via the data uplink and data downlink converter. In the time between these interrupts, the processor is carrying out several other actions e.g. taking decisions wether to switch on or off a delegate microphone or a led, updating memory, etc. The inverted NMI input (Non Maskable Interrupt) is connected to the inverted transmitter/receiver ready/empty control output of the optional UART. The inverted outputs MREQ (memory request), IORQ (I/O request), RD (read) and WR (write) are used via IC16 to read/write the memory and I/O devices.

### 5.2.3 Clock Circuit

This circuit provides a 5.0688 MHz clock signal. IC22 provides clock signals CLK1/CLK2 (used by the data uplink/downlink parts) and a "divided by 8" clock signal (latch clock) to interrupt the uP via the inverted INT input. This latter clock signal is also used by the data uplink/downlink parts and in the circuitry containing IC18, 19 and 20 to provide the LOAD and STROBE pulses.

### 5.2.4 Read/Write, Enabling Circuitry

Via the OR-gates in IC16, read/write enable signals are composed from the inverted signals MREQ, IORQ, RD and WR, at output 11 "memory write" to put the RAM IC7 into the write mode (input enable), at output 3 the "memory read" signal for putting the RAM and/or ROM into the read mode (output enable). IC16-6 provides the I/O write signal and IC16-8 the I/O read signal. The I/O write and I/O read are used to enable respectively IC24a and IC24b. IC24a, using A4 and A5, ensures that IC18 or IC25 is clocked or the optional UART is enabled. Pin 7 of IC24a controls the watchdog timer circuitry. IC24b, using A4 and A5, provides the enable signal for IC17, IC26 or for the optional UART. The EPROM IC8 is enabled seperately by A15 which is connected to the Chip Enable input.

### 5.2.5 Memory

The memory consists of a 32Kbyte EPROM containing the uP program and a 8Kbyte RAM.

### 5.2.6 Optional Serial RS232 Interface

The PCB is prepared for placing an optional UART (IC27) and a buffer (IC28). With these two IC's a serial RS232 interface for connecting e.g. a PC is created. The EPROM must contain dedicated software, which is not standard available, ensuring that the Z80 uP can communicate with the UART.

### 5.2.7 DIL Switch S22

When the tranceiver IC26 is addressed the 8 switch positions of S22 can be read in by the microprocessor. In dedicated software this function will be used for special applications. E.g. when software is implemented to communicate with a PC via the UART, the baudrate of the communication can be adjusted by the DIL switch.

### 5.2.8 LOAD/STROBE Circuitry

From the latch clock made by IC22 and from the 4 data lines D0 through D3 the inverted LOAD and the STROBE pulses for the data uplink/downlink parts are composed. When IC18 is addressed (clocked) by IC24a pin6, the data inputs are switched to the outputs. From the two outputs IC18-3 and 6 the signals LOAD2, LOAD1 (both inverted), STR1 and STR2 are made via IC20 and IC19.

## 5.3 DATA UPLINK/DOWNLINK PART

This part is located both on the uP/switch board 3922 156 06560 (in control desk) or on /01 (control kit) and on the I/O/switch board 3922 156 06550 (in control desk) or on /02 (control kit).

See circuit diagrams fig. 7-1 through 7-4, fig. 9-1 through 9- 4, fig. 11-1 through 11-4 and fig. 13-1 through 13-4.

IC17 is the data uplink converter. It takes care that serial uplink data from the desk buttons ("B" in circuit diagram) or from the delegate request buttons ("C" in circuit diagram) is converted into parallel data for the uP. Serial data is clocked in by the serial clock CLK2, data is strobed into the parallel buffer of IC17 by the latch clock at the C2 input. IC25 is the data downlink converter. This IC ensures that the parallel data from the uP is converted into serial downlink data for desk leds ("A" in circuitdiagram) and for delegate mic. on/off switches ("I" in circuit diagram). Data is transferred from the parallel buffer into the shift register by the latch clock at the C2 input. The serial data is clocked out by the serial clock CLK1.

### 5.3.1 Data Uplink

The serial uplink data stream which is received by IC17 is composed of data representing the status of the desk buttons (B, DATA2 in circuit diagram) or data representing the status of the delegate mic. request buttons (C, DATA3 in the circuit diagram). When a desk button is pushed in, the voltage divider 10K/100K ensures that a voltage of approximately 4.5V (Vdd-Vss) is supplied as a logic "1" to the corresponding input of the parallel to series converters. When on a delegate unit a microphone request button is pressed current can flow from Vdd via the voltage divider 10K/33K to earth (mechanical ground) in the delegate unit. A voltage of approximately 0V (Vss ground reference) is supplied as a logic "0" to the corresponding input of the parallel to serial converters. The parallel status information is converted by IC9, IC10 and IC5 through IC8 (on I/O/switch board) for B, DATA2, and by IC11, IC12 and IC9 through IC12 (on I/O/switch board) for C, DATA3. The microprocessor determines which status data must be converted and finally read in via IC17. When, by dataline D1 via IC18, inverted LOAD1 is activated the status information of the deskbuttons is strobed into the parallel buffers. CLK2 ensures that the data is clocked out serially. When, by dataline D0 via IC18, inverted LOAD2 is activated the status information of the delegate mic. request buttons is strobed into the parallel buffers. The data is also clocked out serially by CLK2.

## 5.3.2 Data Downlink

The serial downlink data stream coming from IC25 is split into data for switching the desk leds on or off and data for switching on or off the delegate microphones. The serial data A, DATA1 is converted by IC1 through IC4 and IC1 through IC4 (on I/O/switch board). When a desk led must be switched on, the open collector output of the converter becomes low (Vss), current can flow from y (Vdd) via the corresponding led and the transistor in the convertor to ground reference (Vss). Serial data I, DATA4 is converted by IC29 ,IC30 and IC13 through IC16 (on the I/O/switch board). When a delegate units microphone must be switched on, the output of the converter becomes low (Vss). The output of the comperator LM324 becomes high (Vdd) with a risetime < 0,5 ms. The corresponding delegate units microphone will be switched on now (remote line becomes active high, Vdd). When a delegate units microphone must be switched off, the output of the converter becomes high (Vdd). The open collector output of the LM 324 becomes 0V (mechanical ground) in a fall off time < 0,5 ms. The switched on delegate microphone will be switched off.

Same as in the uplink part the microprocessor determines which serial data is converted. When, by D0 via IC18, STR1 is activated the serial data stream from IC25 (A,DATA1) will be clocked in serialy by CLK1 and strobed into the parallel buffers by STR1. When, by D1 via IC18, STR2 is activated the serial data stream from IC25 (I,DATA4) will be clocked in serially by CLK1 and strobed into the parallel buffers by STR2.

## 5.3.3 AUTO/MANUAL Mode

### 5.3.3.1 AUTO mode

In the AUTO mode two situations excist, x + y < or = 7 or x + y exceeds 7. X is the number of switched on microphones not having the AUTO FREE status (see 1.1.1) and Y is the number of delegates having the AUTO FREE status (see 1.1.1). When x + y < or = 7, the microphones of calling delegates (AUTO FREE and non AUTO FREE status) are switched on almost directly after the call. When the remote request line from a calling delegate becomes low it will be recognized by the uP (see data uplink 5.3.1). In the next data uplink/downlink cycle, the uP takes care that the particular delegate units microphone will be switched on via the remote line (see data downlink 5.3.2). When x + y exceeds 7, the incoming microphone calls of delegates, not having the AUTO FREE status, are treated as requests to speak, and placed in a wait queue. The uP takes care that after a request, the remote line remains low. The delegates microphone will not be switched on. Due to the low state of the remote line, the green request led in the delegate unit will illuminate (see description in section 2, delegate unit). The delegates having the AUTO FREE status are still able to switch on/off their microphones. When x + y becomes < or equal to 7, automaticly the uP takes care that the first delegate in the wait queue will be switched on (remote line becomes high).

When the operator decides to switch on or off a delegate units microphone (AUTO FREE and non AUTO FREE), he simply controls the particular button on the desk. When x + y exceeds 7, the operator is not able to switch on the delegate microphones, not having the AUTO FREE status, remotely. The AUTO FREE status delegates (Y) can be switched on/off remotely by the operator.

#### 5.3.3.2 MANUAL mode

In the MANUAL mode all the microphone calls of delegates, not having the AUTO FREE status, are treated as requests. After a request, the uP takes care that the remote line to that particular delegate unit remains low. When the operator decides to switch on the microphone of the requesting delegate, he pushes the corresponding (flashing) deskbutton, the remote line will be switched high (see data downlink 5.3.2). The delegates microphone will be switched on, the green request led will be switched off in the delegate unit. All delegates having the AUTO FREE status are able to switch on/off their microphones by themselves.

When the operator decides to switch on or off a delegate units microphone (AUTO FREE and non AUTO FREE), he simply controls the particular button on the desk. When x + y exceeds 7, the operator is not able to switch on the delegate microphones, not having the AUTO FREE status, remotely. The AUTO FREE status delegates (Y) can be switched on/off remotely by the operator.

Via block 11 the chairman is switched on or off by the operator (via the chair desk button), or after a chairmans action (Priority or microphone call).

### 5.4 PRIORITY/DISABLE REQUEST CIRCUIT

This part is located on the uP/switch board 3922 156 06560 (in control desk) or on /01 (control kit).

See circuit diagrams fig. 7-1 through 7-4 and fig. 11-1 through 11-4.

#### 5.4.1 Priority

When the chairman activates his priority it will be recognized by the processor via IC11, pin3. In the next uplink/downlink cycle pin 7 of IC29 is made high (Vdd) by the uP. Via block 12 this priority indication is send (DELII) to the C.S.U. (priority line becomes low, 0V mechanical ground ) for activating the priority chime tone on the audio line. Pin 4 of IC29 becomes low (Vss) via the circuitry around and including TS5, the priority line, which is 27V (inactive) and connected via BU1-1 and BU2-1 to the delegate units, is pulled down to approx. 10V (spec. $9V < V < 14V$). As described in chapter 2, this 10V ($6V < V < 2/3\ V+$) ensures that the delegate microphones are muted during the priority. When priority is released by the chairman the remote line becomes 27V again.

### 5.4.2 Disable Request

Both in AUTO mode as well in MANUAL mode a maximum of 20 microphone requests are registered in chronological order. When this number of requests is reached, the uP takes care that a "disable to request" is generated to all delegate units. Pin 5 of IC29 will be high (Vdd) in this situation, causing TS4 to conduct. The disable to request lines, BU1-2 and BU2-2, will be active high (Vdd). Microphone requests from the delegate will be ignored in the delegate unit as long as the disable request line is active. (see description in section 2, delegate unit).

# 6 PARTS LIST

## 6.1 LBB 3386/40/70

| POSNR. : | DESCRIPTION : | SERVICE CODE : |
|---|---|---|
| | CABLE RELIEF GROMMET<br>(cables del 1,11 to system PSU) | 5322 325 50134 |
| | CABLE ASSEMBLY<br>(cables del 1,11 to system PSU) | 5322 321 21658 |
| | HEADPHONE JACK SOCKET | 5322 267 40568 |
| | RUBBER FOOT (bottom of desk) | 5322 462 44375 |
| | MONITOR LOUDSPEAKER AD3371/Y150 | 4822 240 30172 |
| | POTENTIOMETER LOG. 47K<br>(for volume control) | 5322 101 20998 |
| | COMPLETE SERVICE ASSEMBLY uP PCB | 5322 214 90313 |
| | COMPLETE SERVICE ASSEMBLY I/O PCB | 5322 214 90314 |
| | DUBOX SERVICE ASSEMBLY KIT<br>(25 Crimp-to-wire contacts for use in DUBOX connectors) | 5322 310 31241 |
| | SWITCH MECHANISM<br>(for switch on/off del remotely) | 5322 278 14006 |
| | KNOB WITH LENS<br>(for switch mechanism) | 5322 414 10011 |
| | KNOB WITHOUT LENS<br>(for switch mechanism) | 5322 414 20059 |
| | SHUNT 2p | 5322 115 80116 |
| | INSULATOR FOR IC5 | 5322 255 40792 |
| | BATTERY 3,6V | 4822 138 10046 |
| | CRYSTAL 5,068 MHz | 5322 242 70873 |
| BU1, 2 and 3 | DIN SOCKET 8p | 5322 267 50659 |
| BU4 | DIN SOCKET 6p | 5322 267 44075 |
| BU5 | DIN SOCKET 7p | 4822 264 50101 |
| BU6 | D-TYPE SOCKET 15p | 5322 267 50882 |
| BU7 (and BU1, 2,3 in /70) | D-TYPE SOCKET 25p | 5322 267 60211 |
| | LOCKING SCREW (2)<br>(for connection of d-type socket) | 5322 502 64048 |
| | CONTACT STRIP, 36 PINS | 5322 265 64078 |
| | SOCKET FOR IC 23 OR IC 8<br>(32 pins contact strip) | 5322 255 40923 |
| L1,L2 | COIL 5,5 uH | 4822 158 10107 |
| R138, 139, 163 | P.T.C. RESISTOR 32 OHM | 5322 116 40149 |
| X4 | CONNECTOR 11p | 5322 265 40804 |
| X5,6,7,8 | CONTACT STRIP, 64 PINS | 5322 267 60251 |

## 6.2 LBB 3386/01

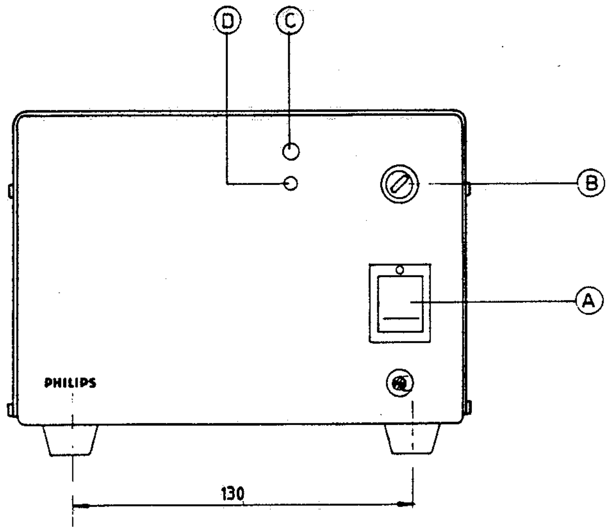
| POSNR : | DESCRIPTION : | SERVICE CODE : |
|---|---|---|
| | CABLE RELIEF GROMMET<br>(cables del 1,11 to system PSU) | 5322 325 50134 |
| | CABLE ASSEMBLY<br>(cables del 1,11 to system PSU) | 5322 321 21658 |
| | HEADPHONE JACK SOCKET | 5322 267 40568 |
| | MONITOR LOUDSPEAKER AD3371/Y150 | 4822 240 30172 |
| | POTENTIOMETER LOG. 47K<br>(for volume control) | 5322 101 20998 |
| | COMPLETE SERVICE ASSEMBLY PCB | 5322 214 90311 |
| | DUBOX SERVICE ASSEMBLY KIT<br>(25 Crimp-to-wire contacts for use in DUBOX connectors) | 5322 310 31241 |
| | CABLE ASSEMBLY<br>(for connection of switch/led) | 5322 321 23155 |
| | CABLE ASSEMBLY<br>(for connection of led) | 5322 321 23156 |
| | CABLE ASSEMBLY<br>(for connection of monitor l.s.) | 5322 321 23157 |
| | CABLE ASSEMBLY<br>(for connection of monitor switch) | 5322 321 23158 |
| | CABLE ASSEMBLY<br>(for connection of switch) | 5322 321 23159 |
| | SHUNT 2p | 5322 115 80116 |
| | INSULATOR FOR IC5 | 5322 255 40792 |
| | BATTERY 3,6V | 4822 138 10046 |
| | CRYSTAL 5,068 MHz | 5322 242 70873 |
| BU1, 2 and 3 | DIN SOCKET 8p | 5322 267 50659 |
| BU4 | DIN SOCKET 6p | 5322 267 44075 |
| BU5 | DIN SOCKET 7p | 4822 264 50101 |
| BU6 | D-TYPE SOCKET 15p | 5322 267 50882 |
| BU7 | D-TYPE SOCKET 25p | 5322 267 60211 |
| | LOCKING SCREW (2)<br>(for connection of d-type socket) | 5322 502 64048 |
| | CONTACT STRIP, 36 PINS | 5322 265 64078 |
| | SOCKET FOR IC 23 OR IC 8<br>(32 pins contact strip) | 5322 255 40923 |
| L1,L2 | COIL 5,5 uH | 4822 158 10107 |
| R138, 139, 163 | P.T.C. RESISTOR 32 OHM | 5322 116 40149 |
| X4 | CONNECTOR 11p | 5322 265 40804 |
| X5,6,7,8 | CONTACT STRIP, 64 PINS | 5322 267 60251 |

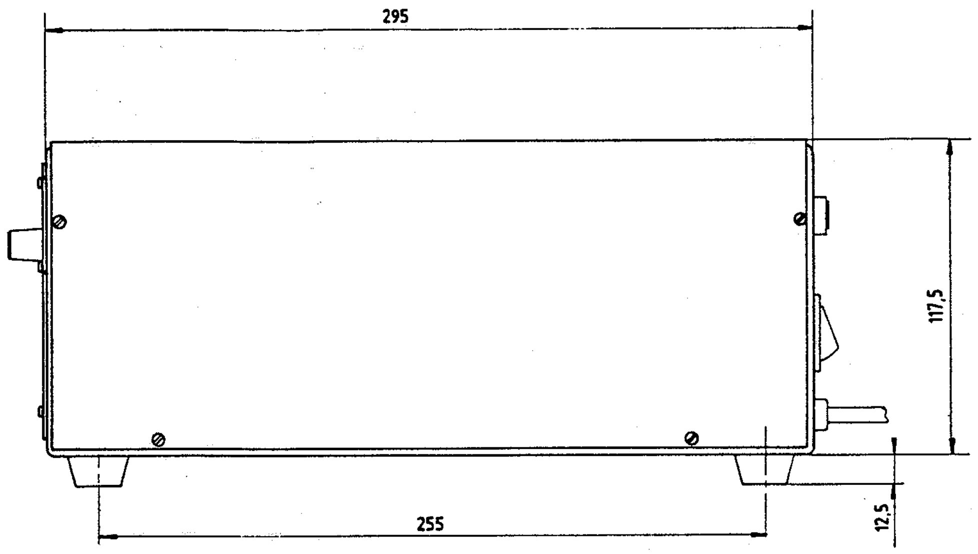
6.3 LBB 3386/02

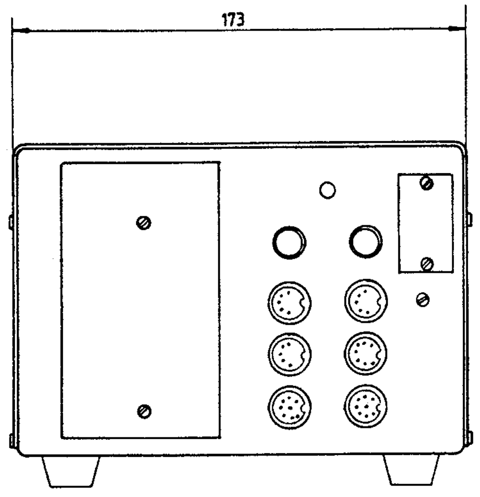
| POSNR : | DESCRIPTION : | SERVICE CODE : |
|---|---|---|
| | CABLE ASSEMBLY<br>(for connection of switch/led) | 5322 321 23155 |
| | COMPLETE SERVICE ASSEMBLY PCB | 5322 214 90312 |
| | DUBOX SERVICE ASSEMBLY KIT<br>(25 Crimp-to-wire contacts for use in DUBOX connectors) | 5322 310 31241 |
| BU1, 2 and 3 | D-TYPE SOCKET 25p | 5322 267 60211 |
| | LOCKING SCREW (2)<br>(for connection of d-type socket) | 5322 502 64048 |
| R124 | P.T.C. RESISTOR 32 OHM | 5322 116 40149 |
| X1,2,3,4,5 | CONTACT STRIP, 64 PINS | 5322 267 60251 |

# 7 DIAGRAMS

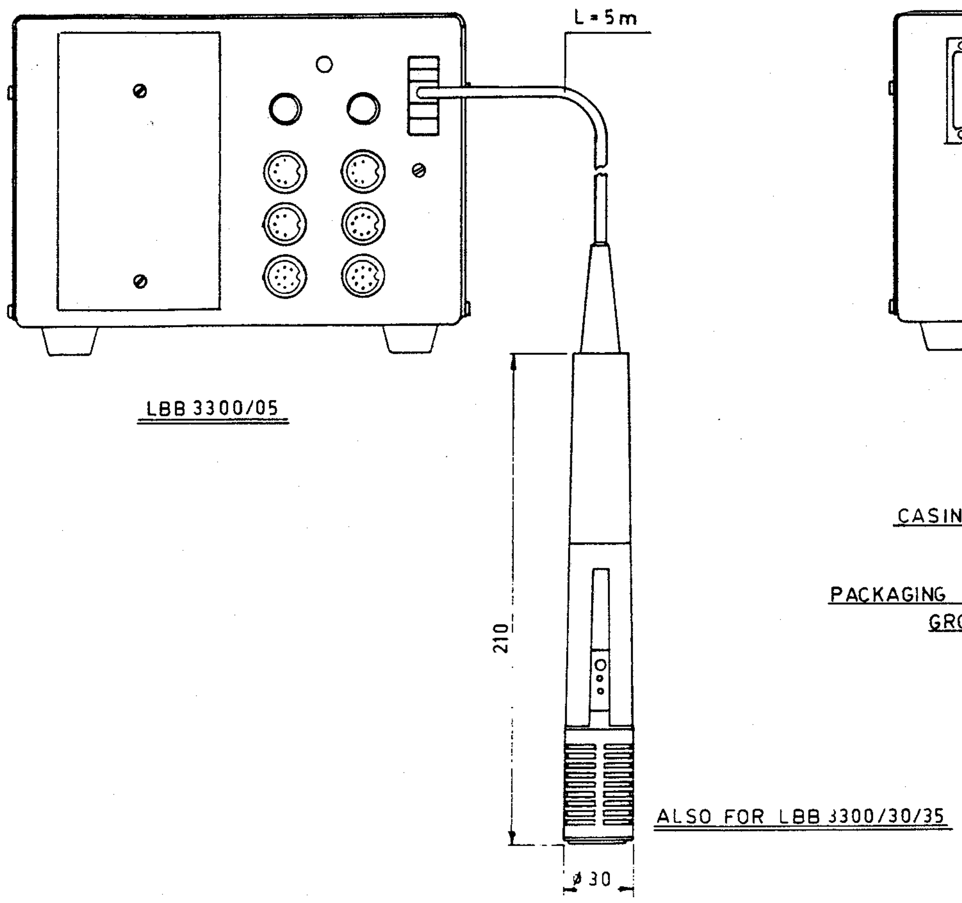
## CENTRAL SUPPLY UNIT


D
C
B
A
PHILIPS
130


295
117,5
255
12,5

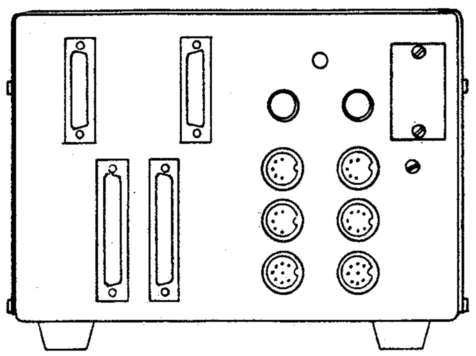


LBB 3300/00



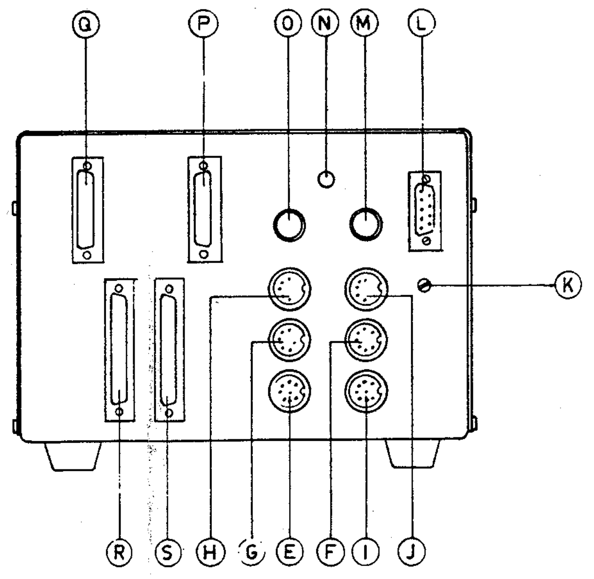
LBB 3300/05

ALSO FOR LBB 3300/30/35



LBB 3300/20/25

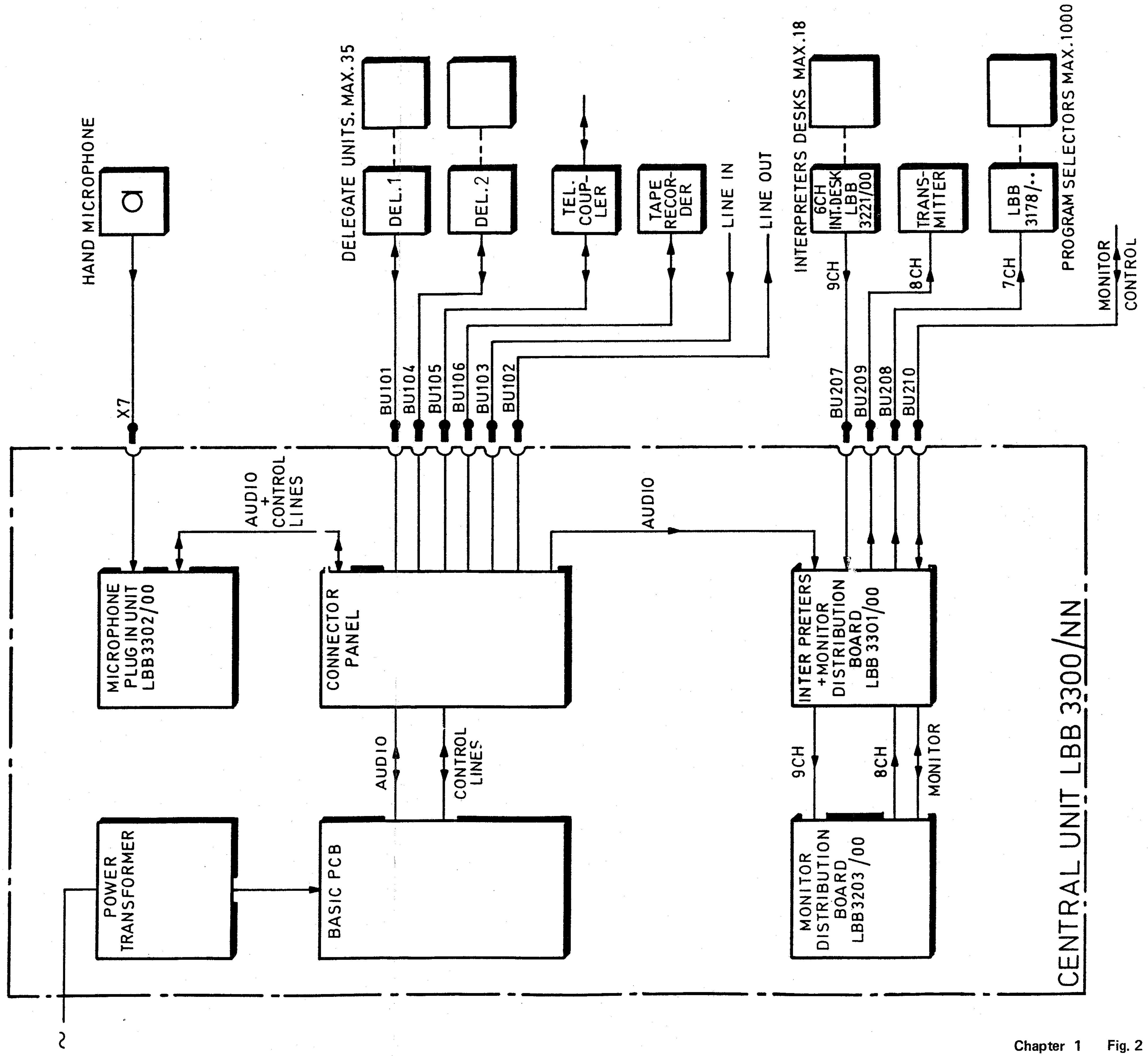
CASING MATERIAL: STEEL SHEET
COLOUR: BROWN 30233
WEIGHT: 4,5 KG
PACKAGING DIMENSIONS: 440 x 255 x 215
GROSS WEIGHT: 5,3 KG


Q
P
O
N
M
L
K
R
S
H
G
E
F
I
J

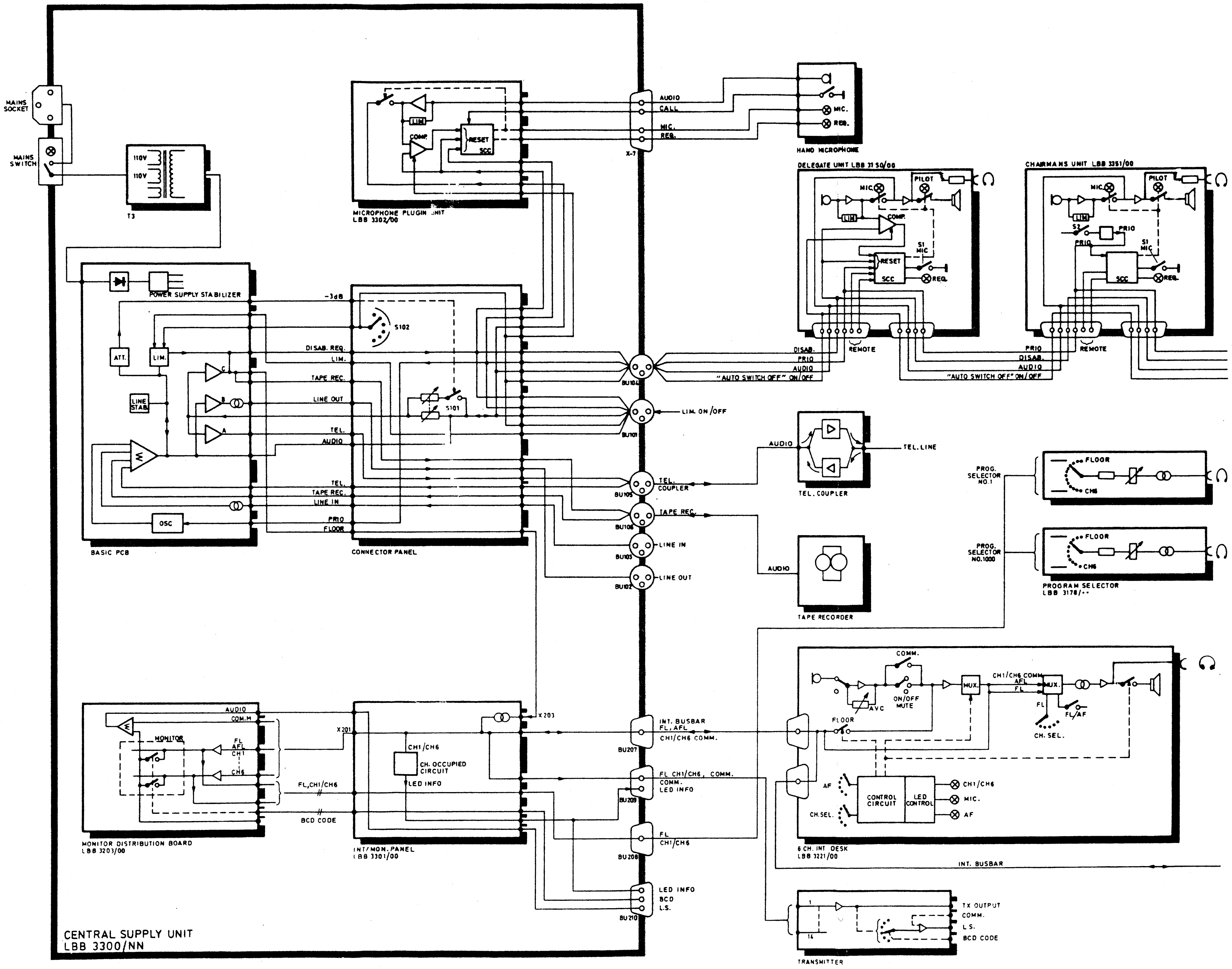
LBB 3300/30/35

Chapter 1 Fig. 1

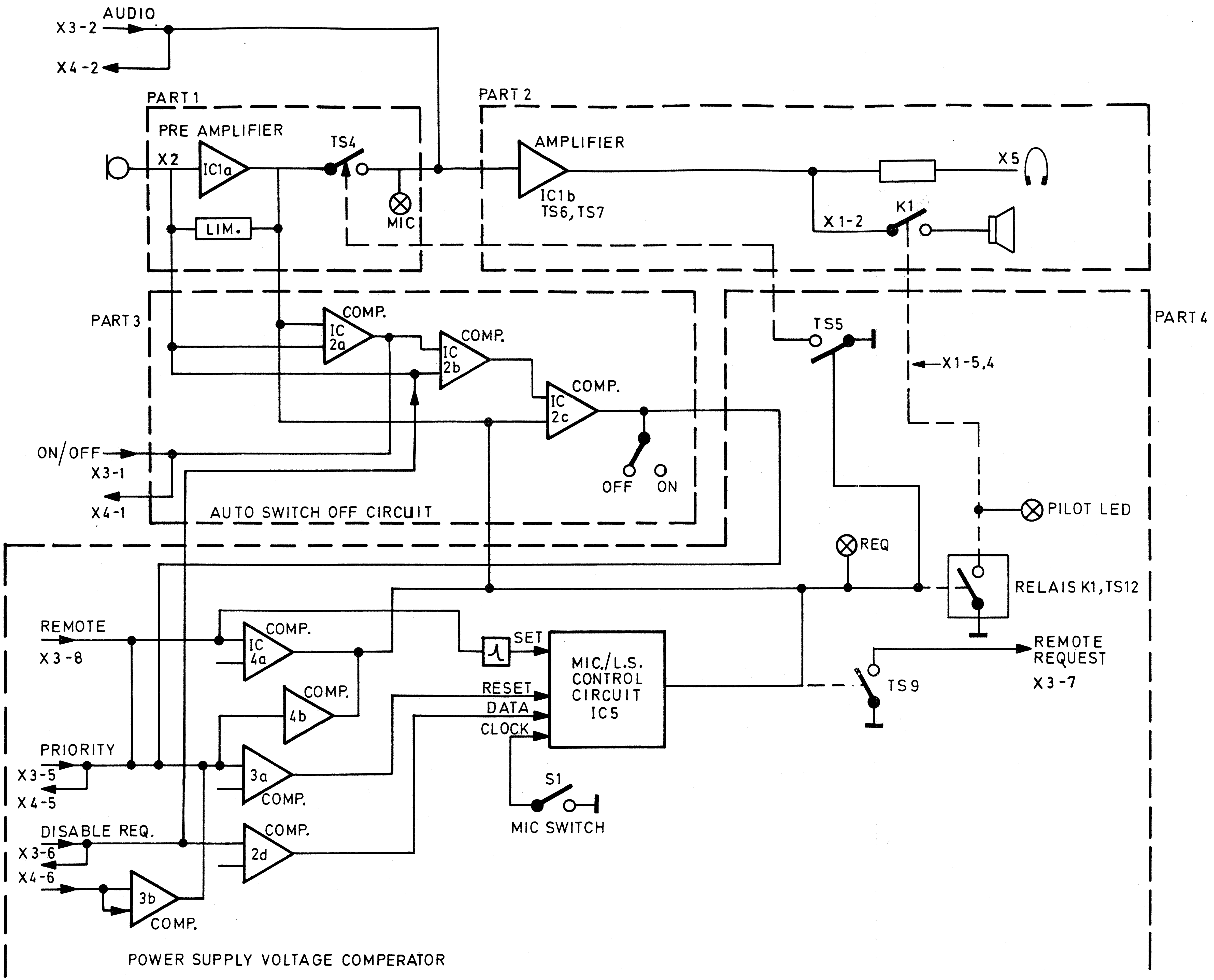
SYSTEM BLOCK DIAGRAM C.S.U.


HAND MICROPHONE
X7
MICROPHONE PLUG IN UNIT LBB3302/00
AUDIO + CONTROL LINES
DELEGATE UNITS. MAX. 35
DEL. 1
DEL. 2
TEL. COUP-LER
TAPE RECOR-DER
LINE IN
LINE OUT
BU101
BU104
BU105
BU106
BU103
BU102
CONNECTOR PANEL
AUDIO
CONTROL LINES
BASIC PCB
POWER TRANSFORMER
INTERPRETERS DESKS MAX. 18
6CH INT. DESK LBB 3221/00
TRANS-MITTER
LBB 3178/..
PROGRAM SELECTORS MAX. 1000
MONITOR CONTROL
9CH
8CH
7CH
BU207
BU209
BU208
BU210
AUDIO
INTER PRETERS +MONITOR DISTRIBUTION BOARD LBB 3301/00
9CH
8CH
MONITOR
MONITOR DISTRIBUTION BOARD LBB3203/00
CENTRAL UNIT LBB 3300/NN
~

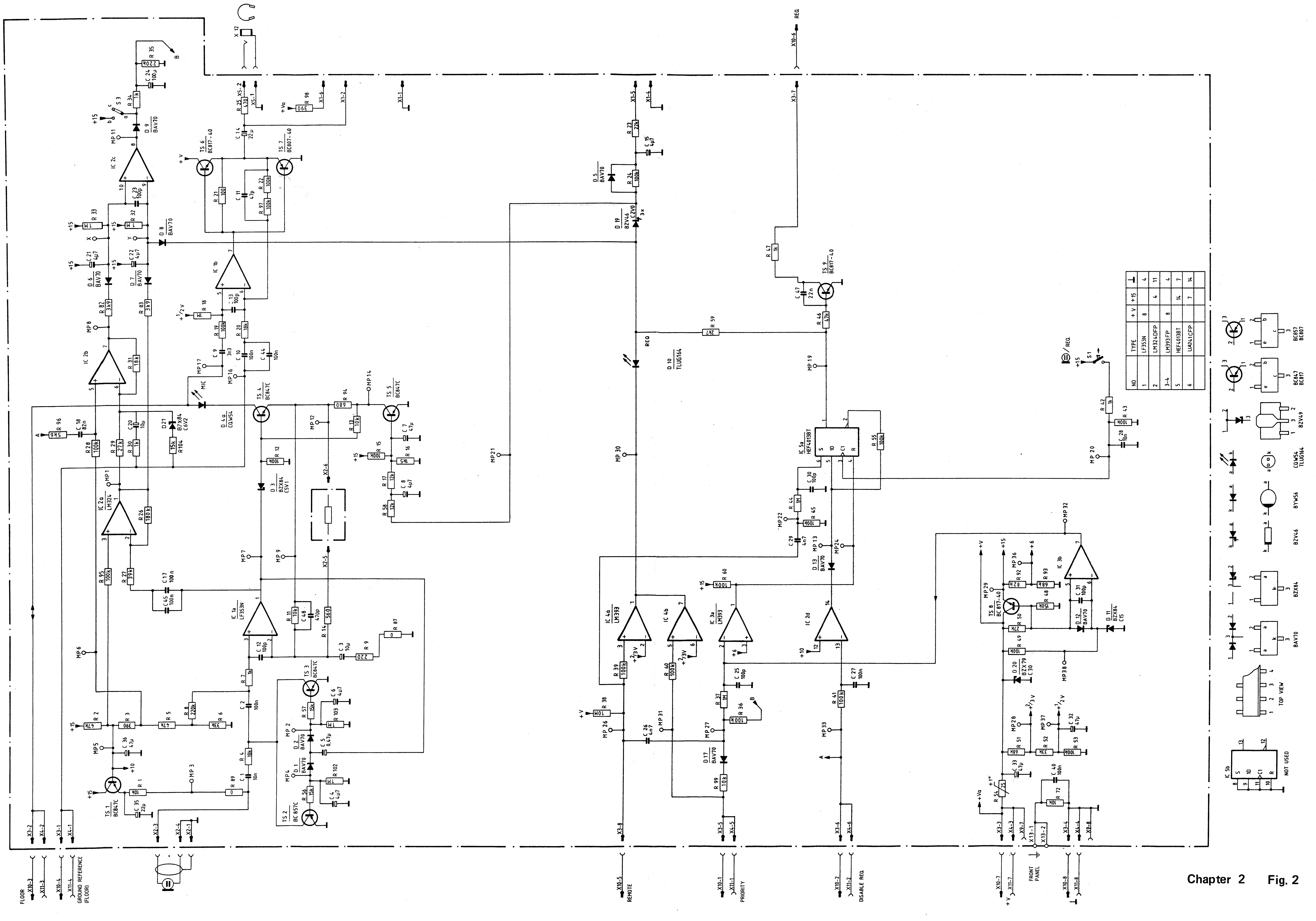
# DETAILED BLOCK DIAGRAM C.S.U. AND PERIPHERALS


MAINS SOCKET
MAINS SWITCH
110V
110V
T3
MICROPHONE PLUGIN UNIT
LBB 3302/00
LIM
COMP.
RESET
SCC
AUDIO
CALL
MIC.
REG.
X-7
HAND MICROPHONE
MIC.
REG.
DELEGATE UNIT LBB 3150/00
CHAIRMANS UNIT LBB 3351/00
MIC
PILOT
COMP.
S1 MIC
S2
PRIO
REG.
REMOTE
DISAB.
PRIO
AUDIO
"AUTO SWITCH OFF" ON/OFF
POWER SUPPLY STABILIZER
ATT.
LIM.
LINE STAB.
OSC
BASIC PCB
-3dB
DISAB. REQ.
LIM.
TAPE REC.
LINE OUT
TEL.
AUDIO
TEL.
TAPE REC.
LINE IN
PRIO
FLOOR
S102
S101
CONNECTOR PANEL
BU104
BU101
LIM. ON/OFF
TEL. COUPLER
BU105
TAPE REC.
BU106
LINE IN
BU103
LINE OUT
BU102
AUDIO
TEL. LINE
TEL. COUPLER
AUDIO
TAPE RECORDER
PROG. SELECTOR NO.1
PROG. SELECTOR NO.1000
FLOOR
CH6
PROGRAM SELECTOR
LBB 3178/··
AUDIO
COM.M
MONITOR
FL
AFL
CH1
CH6
MONITOR DISTRIBUTION BOARD
LBB 3203/00
X201
FL, CH1/CH6
BCD CODE
CH1/CH6
CH. OCCUPIED CIRCUIT
LED INFO
X203
INT/MON. PANEL
LBB 3301/00
INT. BUSBAR
FL, AFL
CH1/CH6 COMM.
BU207
FL CH1/CH6, COMM.
COMM.
LED INFO
BU209
FL
CH1/CH6
BU208
LED INFO
BCD
L.S.
BU210
CENTRAL SUPPLY UNIT
LBB 3300/NN
COMM.
AVC
ON/OFF MUTE
MUX.
CH1/CH6 COMM.
AFL
FL
MUX.
FL
FL/AF
CH. SEL.
FLOOR
AF
CH. SEL.
CONTROL CIRCUIT
LED CONTROL
CH1/CH6
MIC.
AF
6 CH. INT DESK
LBB 3221/00
INT. BUSBAR
1
14
TX OUTPUT
COMM.
L.S.
BCD CODE
TRANSMITTER

DETAILED BLOCK DIAGRAM OF DELEGATE UNIT


AUDIO
X3-2
X4-2
PART 1
PRE AMPLIFIER
X2
IC1a
TS4
LIM.
MIC
PART 2
AMPLIFIER
IC1b
TS6, TS7
X5
X1-2
K1
PART 3
COMP.
IC 2a
COMP.
IC 2b
COMP.
IC 2c
ON/OFF
X3-1
X4-1
OFF
ON
AUTO SWITCH OFF CIRCUIT
PART 4
TS5
X1-5,4
PILOT LED
REQ
RELAIS K1, TS12
REMOTE
X3-8
COMP.
IC 4a
SET
MIC./L.S. CONTROL CIRCUIT IC5
RESET
DATA
CLOCK
COMP.
4b
REMOTE REQUEST
X3-7
TS9
PRIORITY
X3-5
X4-5
3a
COMP.
S1
MIC SWITCH
DISABLE REQ.
X3-6
X4-6
COMP.
2d
3b
COMP.
POWER SUPPLY VOLTAGE COMPERATOR

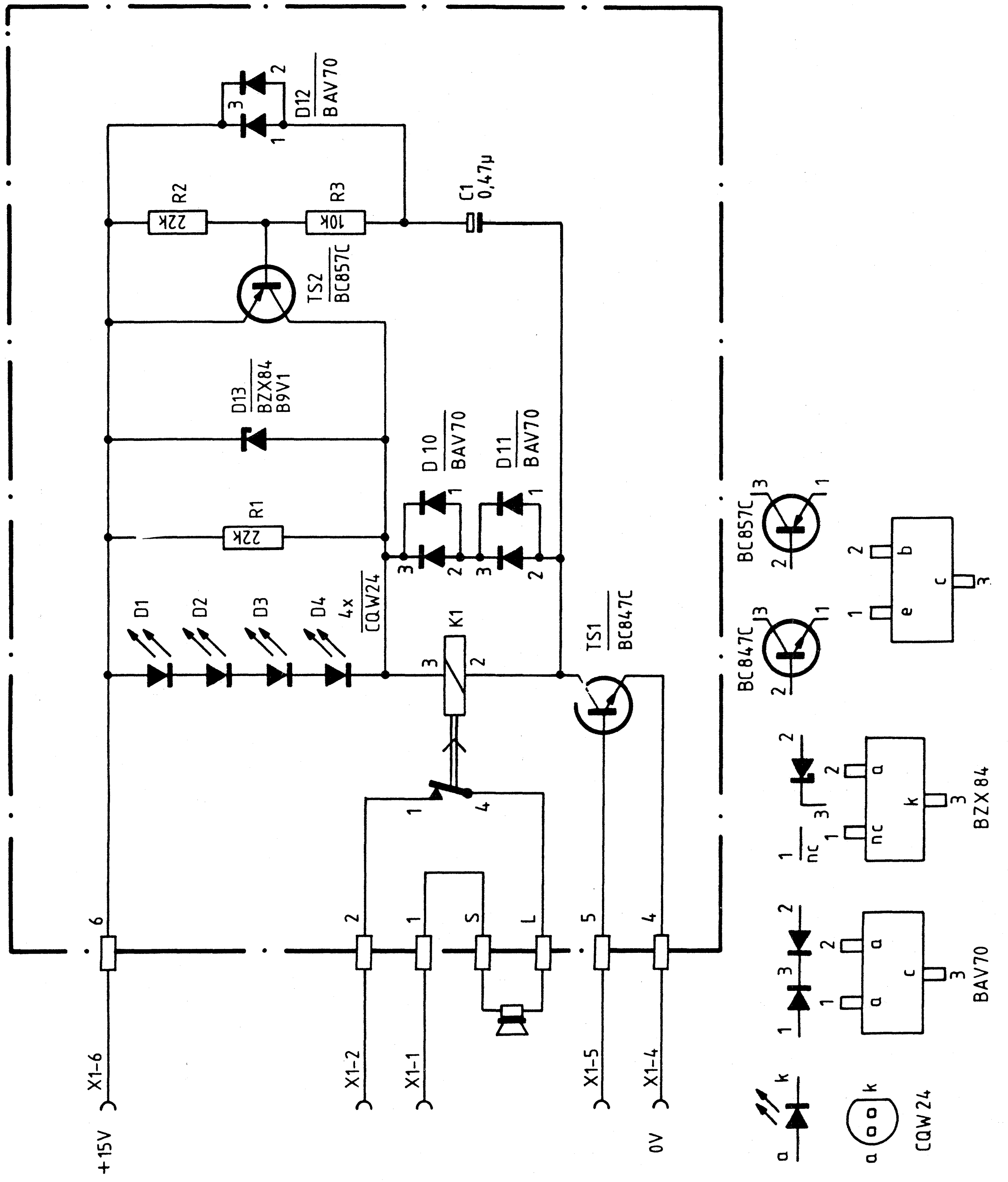
# CIRCUIT DIAGRAM OF DELEGATE UNIT

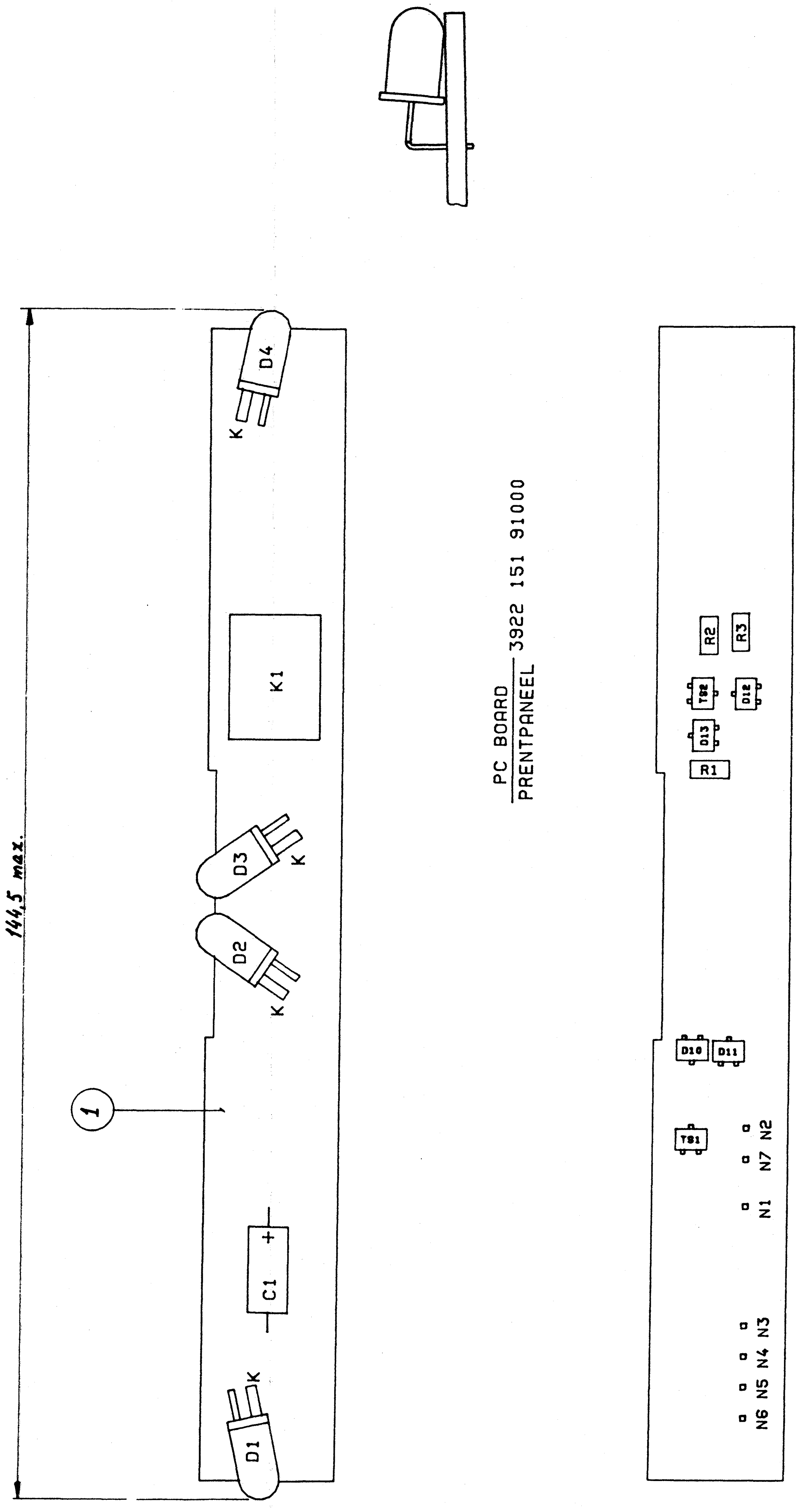


X 12
X10-6
REQ
X5-2
X5-1
X1-6
X1-2
X1-1
X1-5
X1-4
X3-7
R 35 220K
C 24 100µ
R 34 1k
S 3
D 9 BAV70
MP 11
IC 2c
C 23 100p
R 33
R 32
D 8 BAV70
C 21 4µ7
C 22 4µ7
D 6 BAV70
D 7 BAV70
R 82 3k9
R 83 3k9
MP 8
IC 2b
R 31 18k
R 96 5K6
C 18 82n
R 28 100k
R 29 27k
R 30 1k
C 20 10µ
D21 BZX84 C6V2
R104 15k
MP 1
IC 2a LM324
R 26 180k
R 95 100k
R 27 39k
C 17 100n
C 45 100n
MP 6
R 2 47k
R 3 390
R 5 47k
R 8 220k
R 6 33K
MP 5
C 36 47µ
TS 1 BC847C
R 1 10K
C 35 22µ
MP 3
R 89 0
R 25 470
C 14 22µ
R 98 390
TS 6 BC817-40
TS 7 BC807-40
R 21 100
C 11 47p
R 22 100k
R 97 100k
IC 1b
R 18
C 13 100p
R 19 100k
R 20 18k
C 9 3n3
C 10 100n
C 44 100n
MP 17
MP 16
MIC
D 4a CQW54
TS 4 BC847C
TS 5 BC847C
R 94 680
MP 14
MP 12
R 13 10k
C 7 47µ
R 15 100K
R 16 1K5
R 17 12k
C 8 4µ7
R 58 12k
R 12 100K
D 3 BZX84 C5V1
X2-6
X2-5
MP 7
MP 9
IC 1a LF353N
R 11 10k
C 48 470p
R 14 560
C 12 100p
C 3 10µ
R 9 220
R 87 0
R 7 1k
C 2 100n
R 4 10k
C 1 10n
TS 3 BC847C
R 57 15k
C 6 4µ7
R 103 1M
MP 2
D 2 BAV70
C 5 0,47µ
MP 4
D 1 BAV70
R 102
R 56 15k
C 4 4µ7
TS 2 BC857C
MP21
R 23 22k
C 15 4µ7
D 5 BAV70
R 24 100k
D 19 BZV46 C2V0 3x
R 47 1k
TS 9 BC817-40
C 47 22n
R 59 2k7
R 46 47k
REQ
D 10 TLUG164
MP 19
MP 30
IC 5a HEF4013BT
R 55 100k
C 30 100p
R 44 1M
R 45 100K
MP 22
C 29 4n7
MP 13
MP 24
D 13 BAV70
R 60 100K
IC 4a LM393
IC 4b
IC 3a LM393
IC 2d
R 39 100k
R 40 100k
C 25 100p
C 27 100n
R 41 100k
R 38 10M
MP 26
C 26 4n7
MP 31
R 37 1M
R 36 100K
MP 27
D 17 BAV70
R 99 10k
MP 33
S 1
REQ
R 42 1k
R 43 100K
C 28 10n
MP 20
MP 32
IC 3b
MP 36
R 92 82K
R 93 68K
MP 29
TS 8 BC817-40
R 48 150K
C 31 100p
R 50 27K
D 12 BAV70
D 11 BZX84 C15
R 49 100K
MP 38
D 20 BZX79 C30
MP 28
MP 37
C 32 47µ
R 51 68K
R 52 33K
R 53 100K
C 33 47µ
C 40 100n
R 54 25
R 72 10K
X3-2
X4-2
X3-1
X4-1
X2-3
X2-4
X2-1
X3-8
X3-5
X4-5
X3-6
X4-6
X3-3
X4-3
X9-7
X13-1
X13-2
X3-4
X4-4
X9-8
X10-3
X11-3
FLOOR
X10-4
X11-4
GROUND REFERENCE (FLOOR)
X10-5
REMOTE
X10-1
X11-1
PRIORITY
X10-2
X11-2
DISABLE REQ.
X10-7
X11-7
FRONT PANEL
X10-8
X11-8
BC857 BC807
BC847 BC817
BZV49
CQW54 TLUG164
BYW56
BZV46
BZX84
BAV70
TOP VIEW
IC 5b
NOT USED

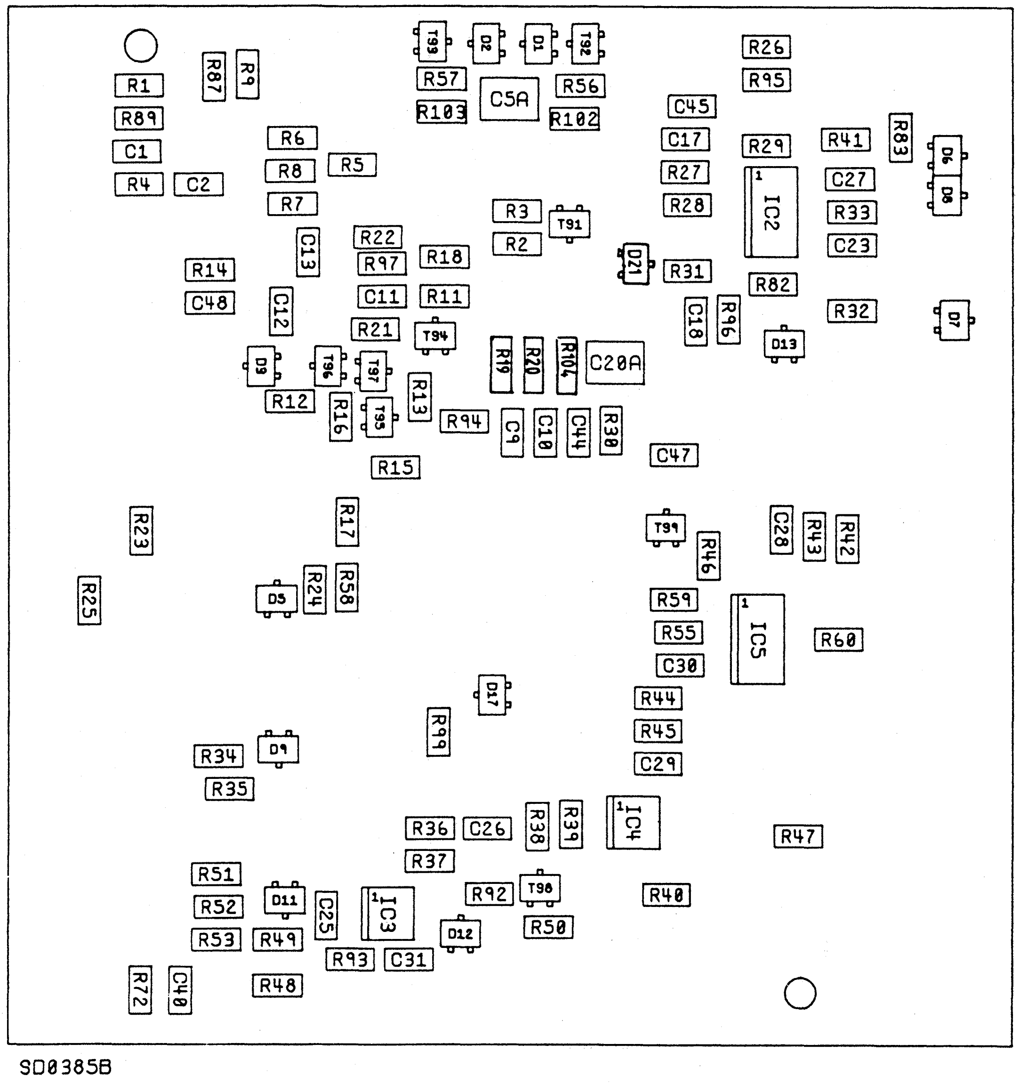
| NO | TYPE | + V | +15 | ⊥ |
|---|---|---|---|---|
| 1 | LF353N | 8 | | 4 |
| 2 | LM324DFP | | 4 | 11 |
| 3-4 | LM393FP | 8 | | 4 |
| 5 | HEF4013BT | | 14 | 7 |
| 6 | UA741CFP | | 7 | 14 |
| | | | | |

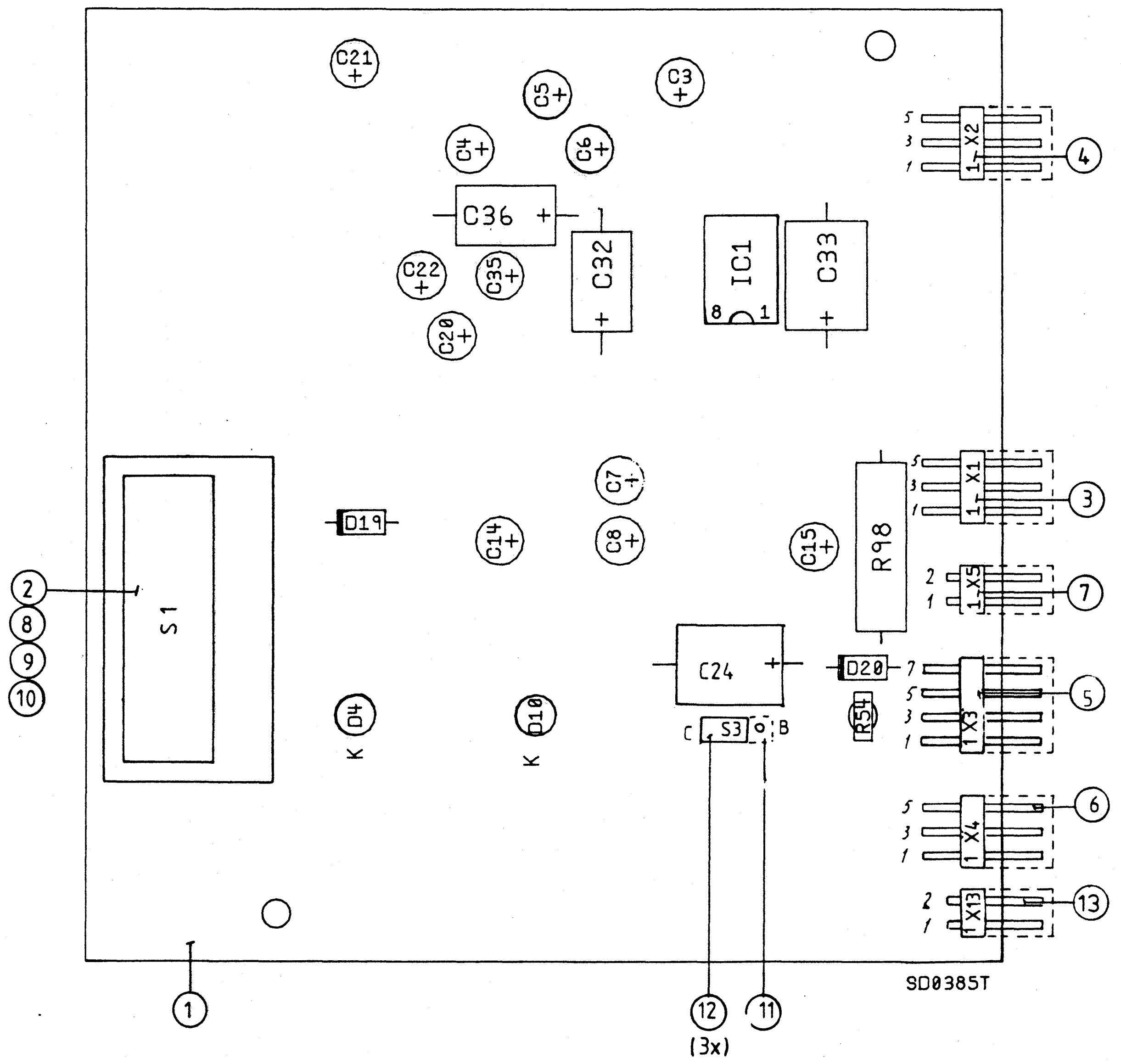
# CIRCUIT DIAGRAM AND LOCATION OF COMPONENTS LOUDSPEAKER


D12
BAV70
1
2
3
R2
22k
R3
10k
C1
0,47µ
TS2
BC857C
D13
BZX84
B9V1
R1
22k
D 10
BAV70
D11
BAV70
D1
D2
D3
D4
4x
CQW24
K1
TS1
BC847C
6
2
1
S
L
5
4
X1-6
+15V
X1-2
X1-1
X1-5
X1-4
0V
BC857C
BC847C
e
b
c
nc
a
k
BZX84
BAV70
CQW24

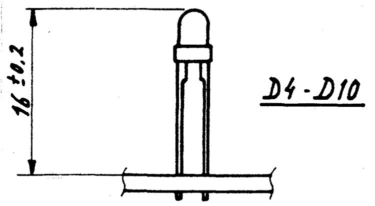

D4
K
K1
D3
D2
D1
C1
+
144,5 max.
1
PC BOARD
PRENTPANEEL
3922 151 91000
R2
R3
TS2
D12
D13
R1
D10
D11
TS1
N2
N7
N1
N3
N4
N5
N6

## LOCATION OF COMPONENTS OF DELEGATE UNIT

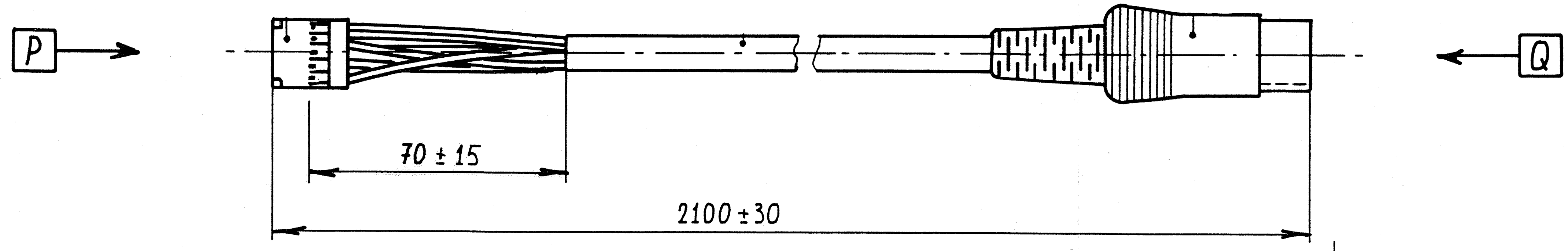

R1
R89
C1
R4
C2
R87
R9
T99
D2
D1
T92
R57
R103
C5A
R56
R102
R26
R95
C45
C17
R27
R28
R29
IC2
R41
C27
R33
C23
R83
D6
D8
R6
R8
R5
R7
R3
R2
T91
D21
R31
R82
R32
C13
R22
R97
R18
C11
R11
R21
T94
R14
C48
C12
D3
T96
T97
R19
R20
R104
C20A
C18
R96
D13
D7
R12
R16
T95
R13
R94
C9
C10
C44
R30
C47
R15
R23
R17
T93
R46
C28
R43
R42
R25
D5
R24
R58
R59
R55
IC5
R60
C30
D17
R44
R45
R99
R34
D9
C29
R35
R36
C26
R38
R39
IC4
R47
R37
R51
D11
C25
IC3
R92
T98
R40
R52
R49
D12
R50
R53
R93
C31
R72
C40
R48
SD0385B

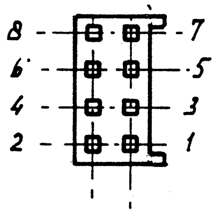

C21
C5
C3
C4
C6
C36
C22
C35
C32
IC1
8
1
C33
C20
X2
5
3
1
4
D19
C7
C14
C8
C15
R98
X1
3
X5
2
1
7
S1
2
8
9
10
C24
D20
X3
7
5
3
1
R54
D4
D10
K
K
S3
C
B
X4
6
X13
13
1
12
11
(3x)
SD0385T

PC BOARD / PRENTPANEEL 3922 151 90850

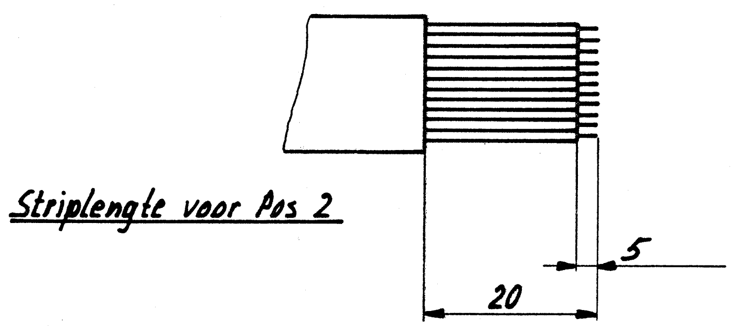


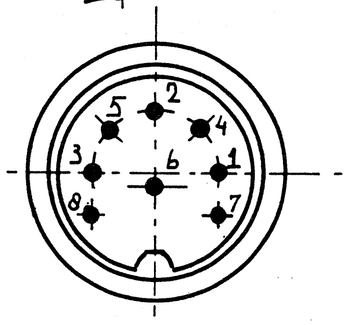
## CONNECTIONS, DELEGATE UNIT CABLE ASSEMBLY

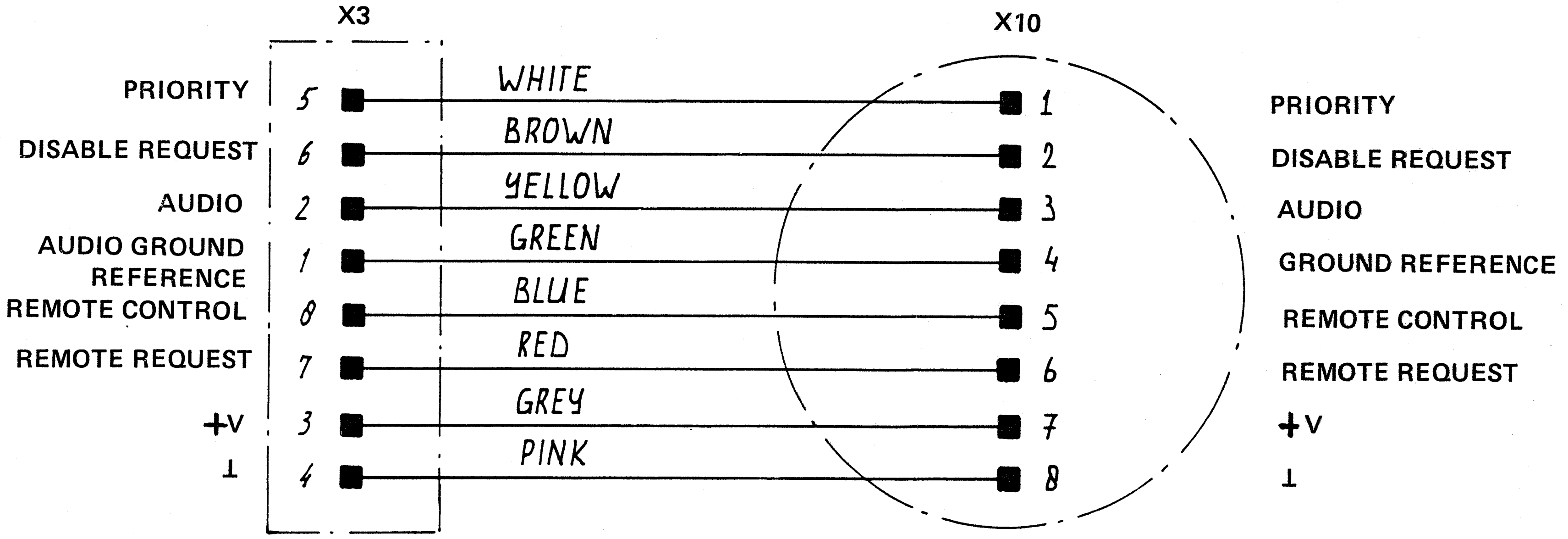

P
Q
70 ± 15
2100 ±30



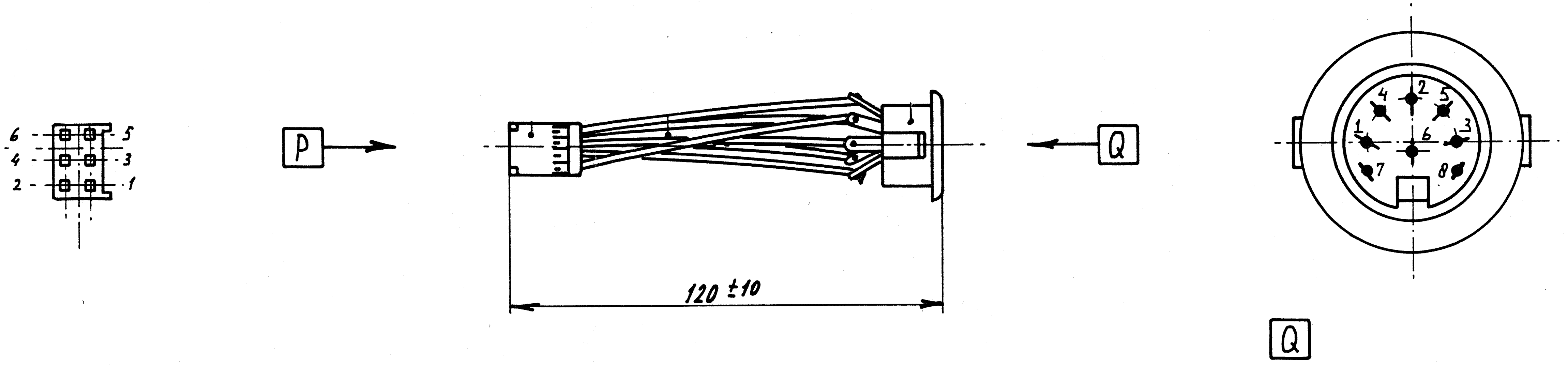
P SCHAAL 2:1

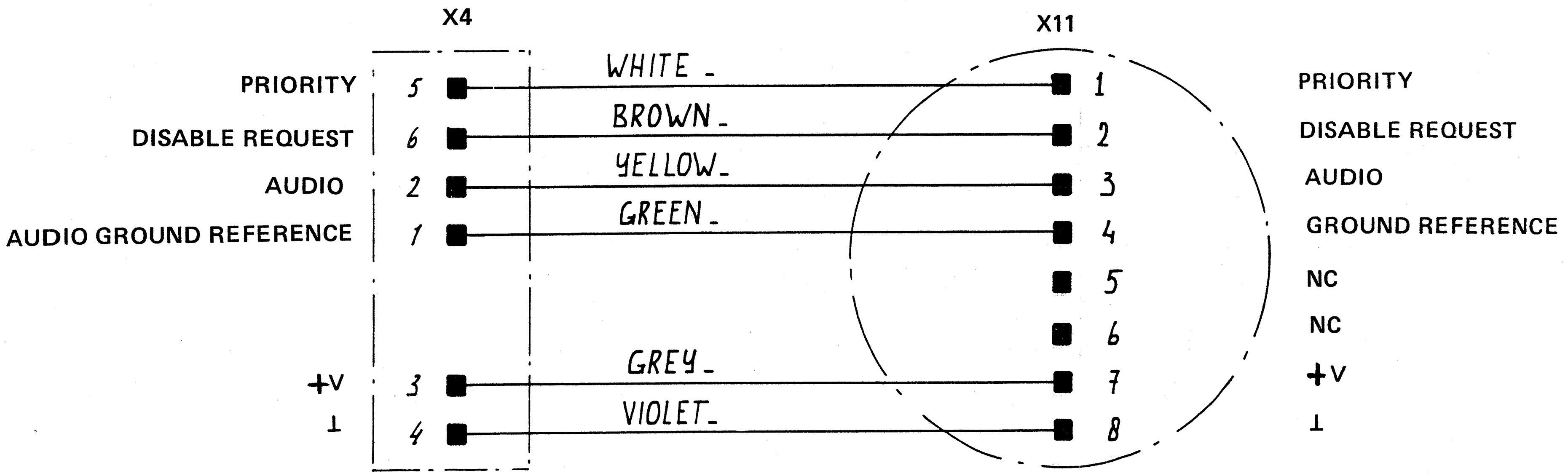

Striplengte voor Pos 2
5
20



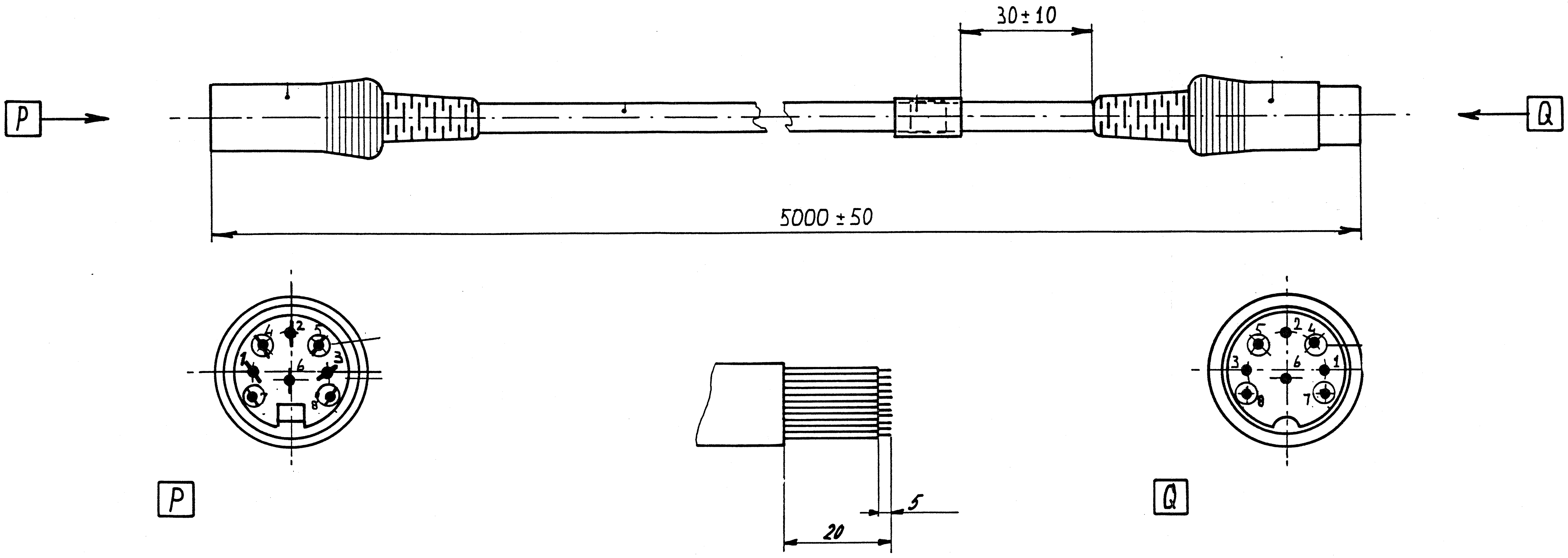

X3
X10
PRIORITY
5
WHITE
1
PRIORITY
DISABLE REQUEST
6
BROWN
2
DISABLE REQUEST
AUDIO
2
YELLOW
3
AUDIO
AUDIO GROUND REFERENCE
1
GREEN
4
GROUND REFERENCE
REMOTE CONTROL
8
BLUE
5
REMOTE CONTROL
REMOTE REQUEST
7
RED
6
REMOTE REQUEST
+V
3
GREY
7
+V
⊥
4
PINK
8
⊥

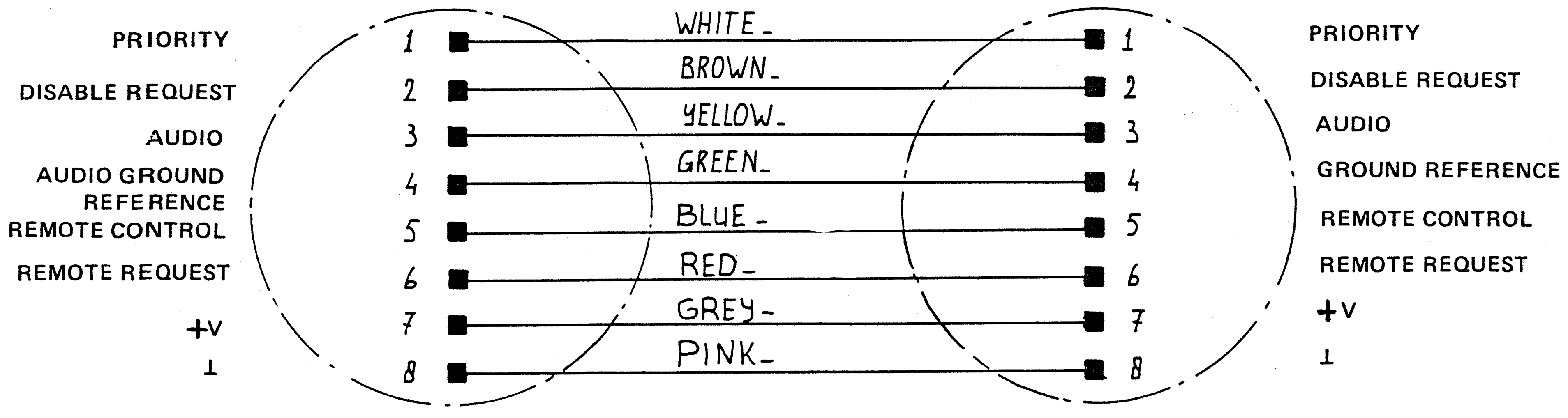
## CONNECTIONS, DELEGATE UNIT CABLE ASSEMBLY INSIDE


6
5
4
3
2
1
P
120 ±10
Q
4
2
5
1
6
3
7
8
Q


X4
X11
PRIORITY
5
WHITE
1
PRIORITY
DISABLE REQUEST
6
BROWN
2
DISABLE REQUEST
AUDIO
2
YELLOW
3
AUDIO
AUDIO GROUND REFERENCE
1
GREEN
4
GROUND REFERENCE
5
NC
6
NC
+V
3
GREY
7
+V
⊥
4
VIOLET
8
⊥

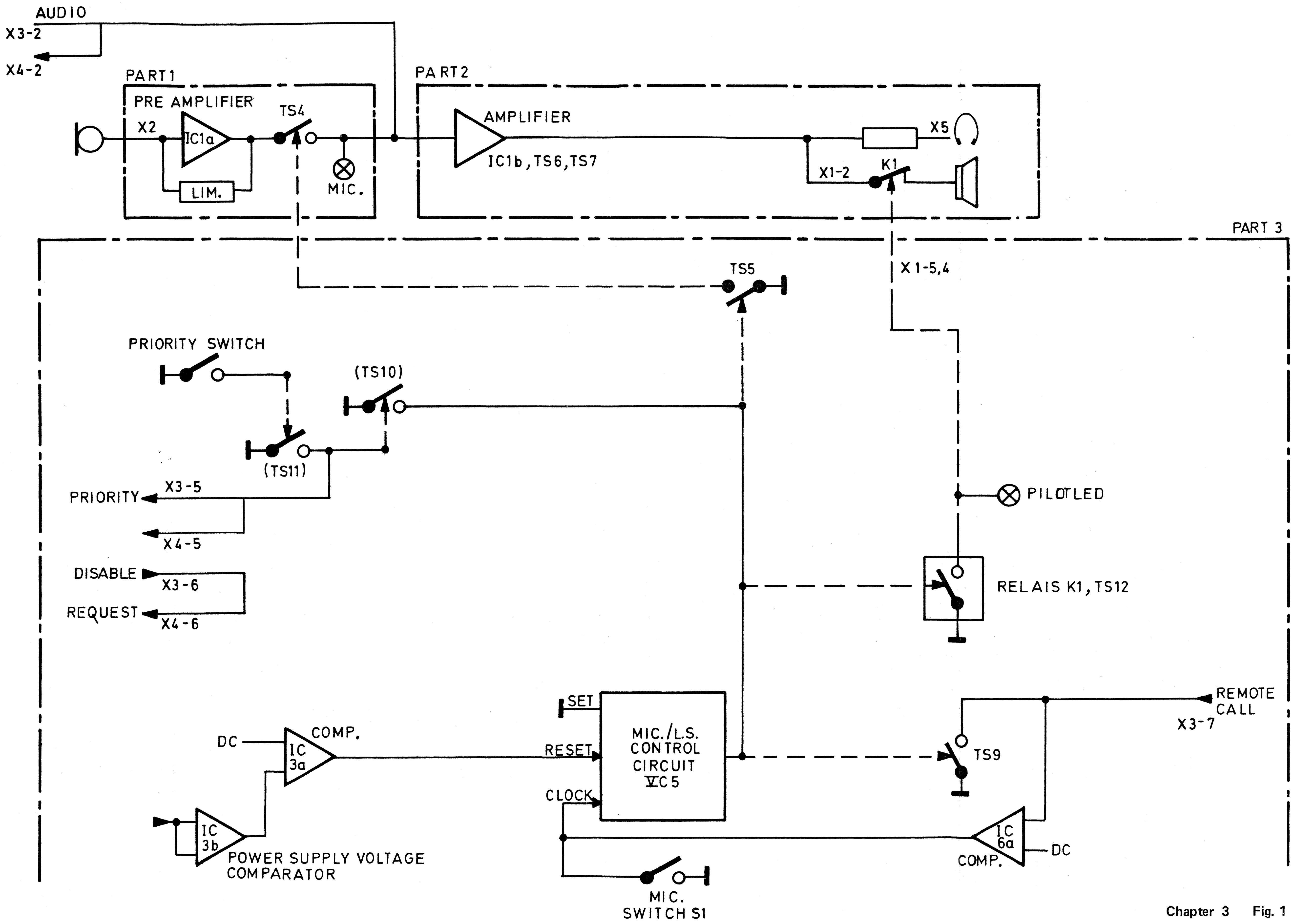
EXTENSION CABLE LBB 3305/00


P
30 ± 10
Q
5000 ± 50
2
4
5
1
6
3
7
8
P
5
20
5
2
4
3
6
1
8
7
Q


PRIORITY
DISABLE REQUEST
AUDIO
AUDIO GROUND REFERENCE
REMOTE CONTROL
REMOTE REQUEST
+V
⊥
1
2
3
4
5
6
7
8
WHITE
BROWN
YELLOW
GREEN
BLUE
RED
GREY
PINK
1
2
3
4
5
6
7
8
PRIORITY
DISABLE REQUEST
AUDIO
GROUND REFERENCE
REMOTE CONTROL
REMOTE REQUEST
+V
⊥

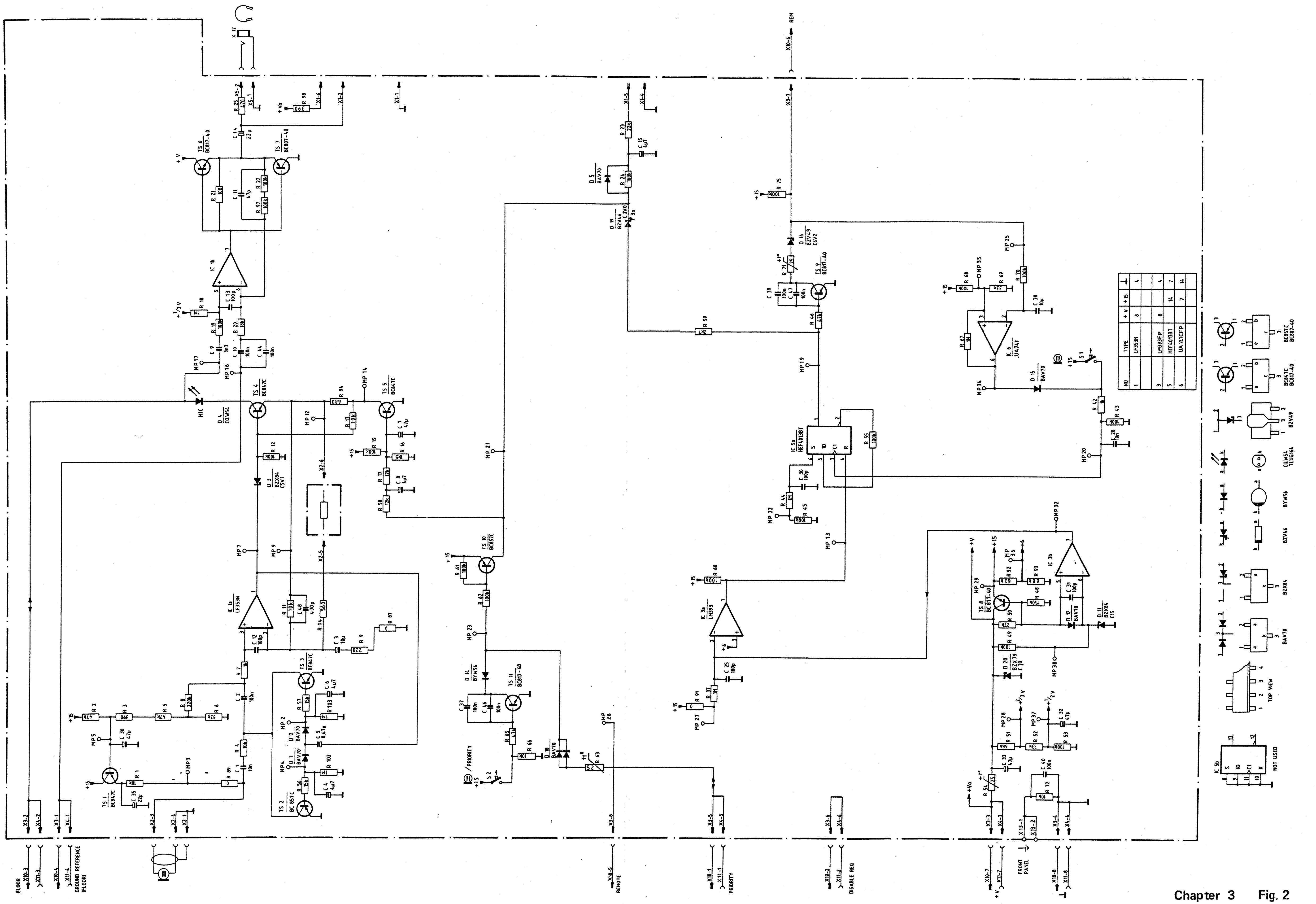
Chapter 2 Fig. 5.c

DETAILED BLOCK DIAGRAM OF CHAIRMANS UNIT


AUDIO
X3-2
X4-2
PART1
PRE AMPLIFIER
X2
IC1a
LIM.
TS4
MIC.
PART2
AMPLIFIER
IC1b, TS6, TS7
X5
X1-2
K1
PART 3
TS5
X 1-5,4
PRIORITY SWITCH
(TS10)
(TS11)
PRIORITY
X3-5
X4-5
DISABLE
X3-6
REQUEST
X4-6
PILOTLED
RELAIS K1, TS12
SET
RESET
CLOCK
MIC./L.S. CONTROL CIRCUIT IC5
REMOTE CALL
X3-7
TS9
DC
COMP.
IC 3a
IC 3b
POWER SUPPLY VOLTAGE COMPARATOR
IC 6a
COMP.
DC
MIC. SWITCH S1

Chapter 3 Fig. 1

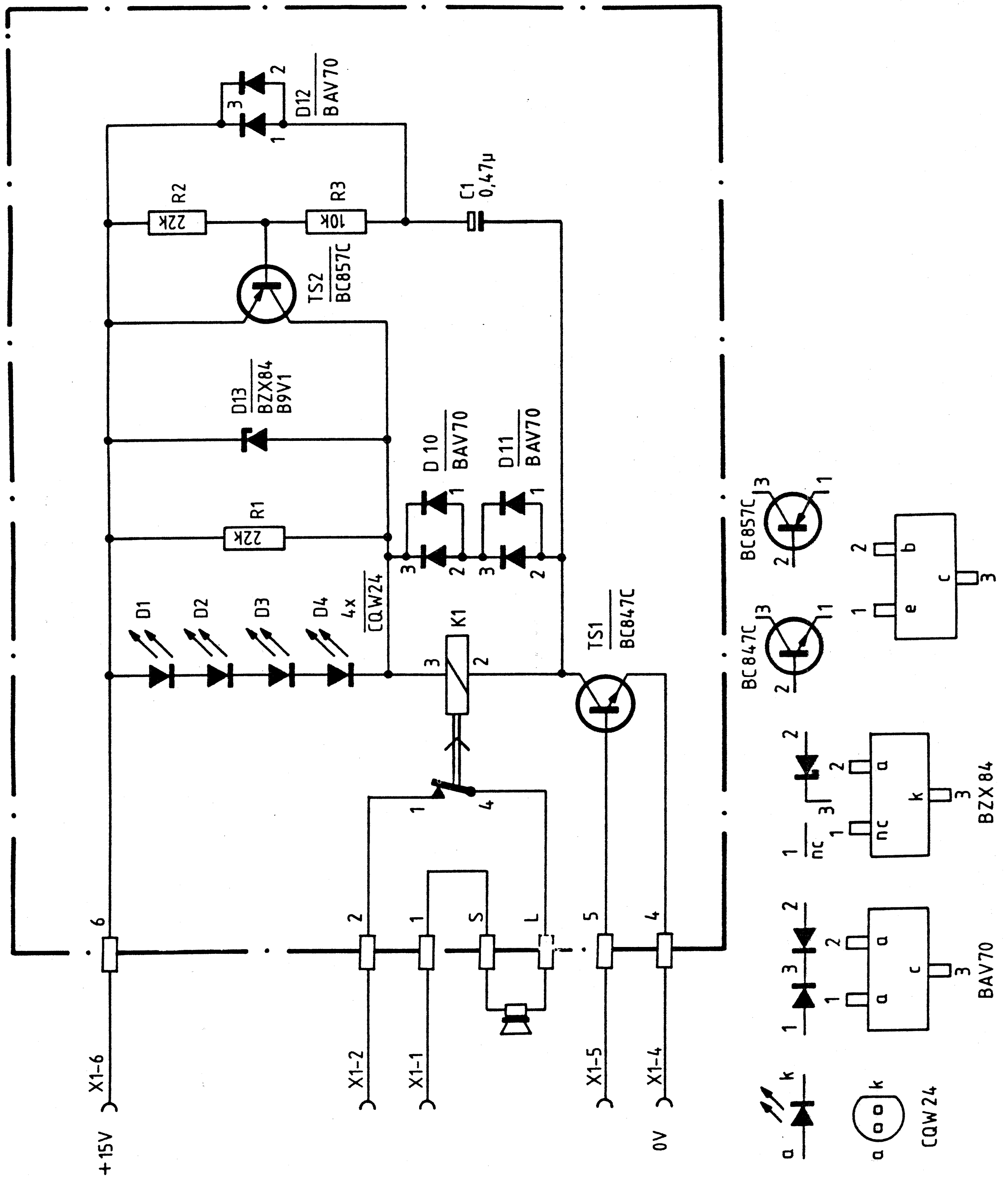
# CIRCUIT DIAGRAM OF CHAIRMANS UNIT

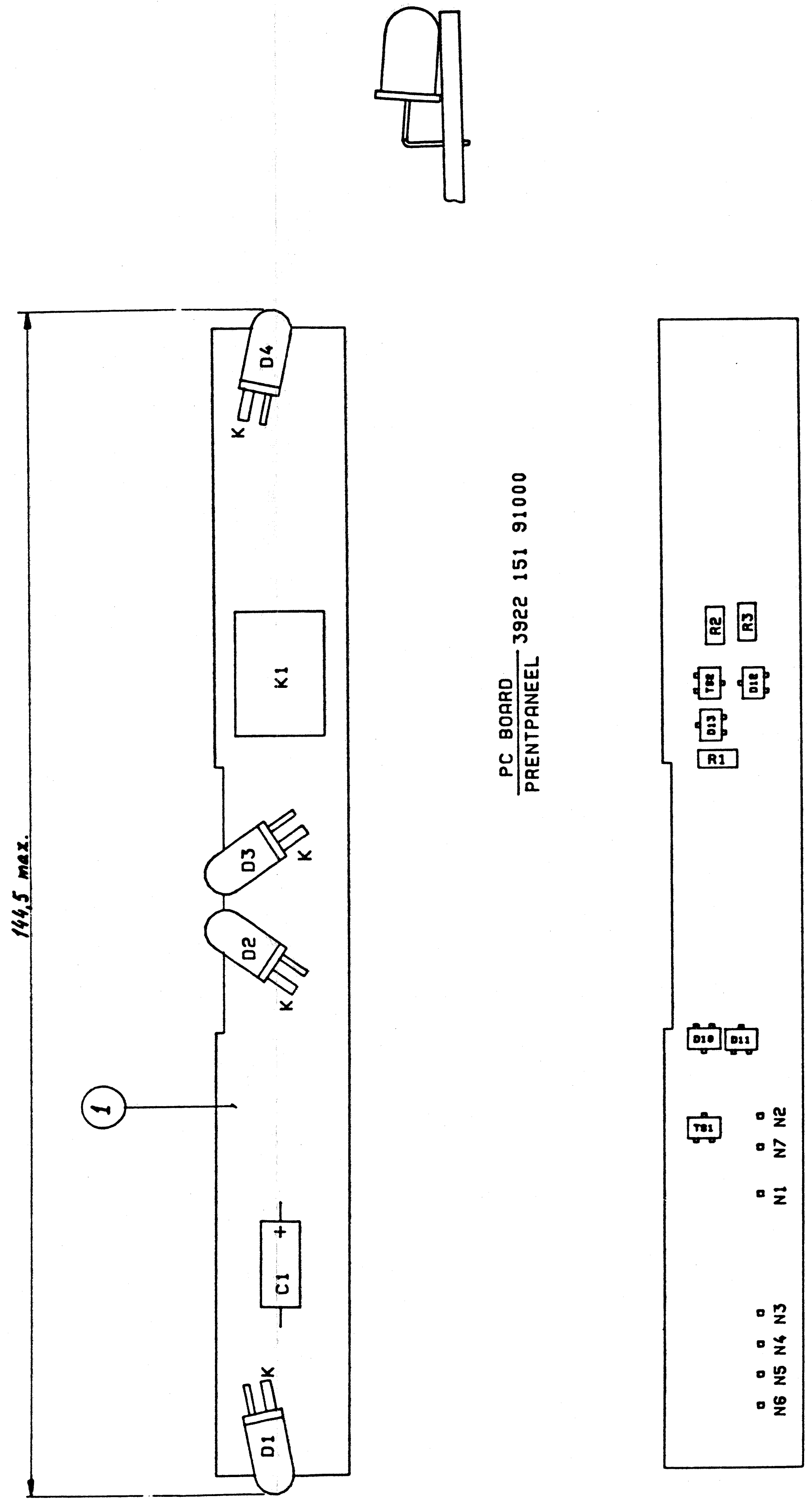

X 12
X5-2
X5-1
R 25 47Ω
C 14 22µ
+Va
R 98 390
X1-6
X1-2
X1-1
TS 6 BC817-40
TS 7 BC807-40
R 21 100
C 11 47p
R 22 100k
R 97 100k
IC 1b
C 13 100p
+½V
R 18 1M
R 19 100k
R 20 18k
C 9 3n3
C 10 100n
C 44 100n
MP 17
MP 16
MIC
D 4 COW54
TS 4 BC847C
R 94 680
MP 14
TS 5 BC847C
MP 12
R 13 10k
C 7 47µ
R 12 100k
R 15 100k
R 16 1k5
+15
D 3 BZX84 C5V1
R 17 12k
C 8 4µ7
R 58 12k
X2-6
X2-5
MP 7
MP 9
IC 1a LF353H
R 11 10k
C 48 470p
R 14 560
R 87 0
C 3 10µ
R 9 220
C 12 100p
R 7 1M
R 8 220k
C 2 100n
R 2 4k7
R 3 390
R 5 4k7
R 6 33E
C 36 47µ
MP 5
R 4 10k
C 1 10n
TS 1 BC847C
C 35 22p
R 1 10k
MP 3
R 89 0
TS 3 BC847C
C 6 4µ7
R 57 5k6
R 103 1M
MP 2
D 2 BAV70
C 5 0,47µ
MP 4
D 1 BAV70
R 102 1M
R 56 5k6
C 4 4µ7
TS 2 BC 857C
X1-5
X1-4
R 23 22k
C 15 4µ7
D 5 BAV70
R 24 100k
D 19 BZV46 C2V0 3x
MP 21
TS 10 BC857C
R 61 100k
R 62 100k
MP 23
D 14 BYW56
TS 11 BC817-40
C 37 100n
C 46 100n
R 65 47k
R 66 10k
D 18 BAV70
R 63 +ϑ
MP 26
S 2 PRIORITY
X10-6
REM
X3-7
R 75 100K
D 16 BZV49 C6V2
R 71 +ϑ
TS 9 BC817-40
C 39 100n
C 47 100n
R 46 47k
R 59 2k7
MP 19
IC 5a HEF4013BT
R 55 100k
C 30 100p
R 44 1M
R 45 100k
MP 22
MP 13
R 60 100k
IC 3a LM393
C 25 100p
R 91 0
R 37 1M
MP 27
MP 35
MP 25
R 68 100k
R 69 33E
R 70 100k
C 38 10n
R 67 1M
IC 6 UA741
MP 34
D 15 BAV70
S 1
R 42 1k
R 43 100K
C 28 10n
MP 20
MP 32
IC 3b
MP 36
+6
R 92 6k2
R 93 68k
MP 29
TS 8 BC817-40
R 48 150k
C 31 100p
R 50 2k7
D 12 BAV70
D 11 BZX84 C15
R 49 100k
MP 38
D 20 BZX79 C30
MP 28
⅔V
MP 37
⅓V
C 32 47µ
R 51 68k
R 52 33E
R 53 100k
C 33 47µ
C 40 100n
R 54 +ϑ
R 72 10k
X3-2
X4-2
X3-1
X4-1
X2-3
X2-4
X2-1
X3-8
X3-5
X4-5
X3-6
X4-6
X3-3
X4-3
X13-1
X13-2
X3-4
X4-4
FLOOR X10-3 X11-3
X10-4 X11-4 GROUND REFERENCE (FLOOR)
X10-5 REMOTE
X10-1 X11-1 PRIORITY
X10-2 X11-2 DISABLE REQ.
X10-7 X11-7 +V
FRONT PANEL
X10-8 X11-8
BC857C BC807-40
BC847C BC817-40
BZV49
COW54 TLUG164
BYW56
BZV46
BZX84
BAV70
TOP VIEW
IC 5b NOT USED

| NO | TYPE | + V | + 15 | ⊥ |
|---|---|---|---|---|
| 1 | LF353N | 8 |  | 4 |
|  |  |  |  |  |
| 3 | LM393FP | 8 |  | 4 |
| 5 | HEF4013BT |  | 14 | 7 |
| 6 | UA 741CFP |  | 7 | 14 |
|  |  |  |  |  |

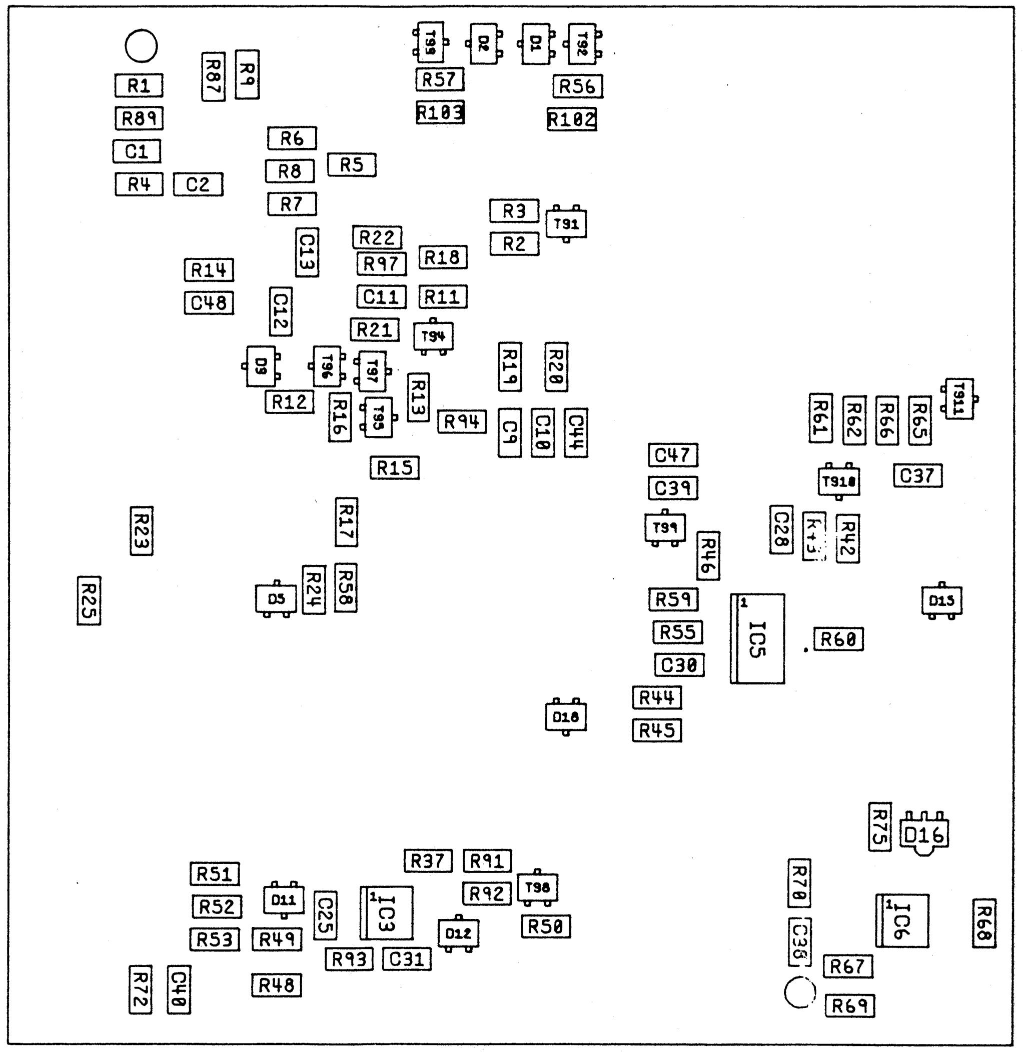
Chapter 3 Fig. 2

CIRCUIT DAIGRAM AND LOCATION OF COMPONENTS LOUDSPEAKER

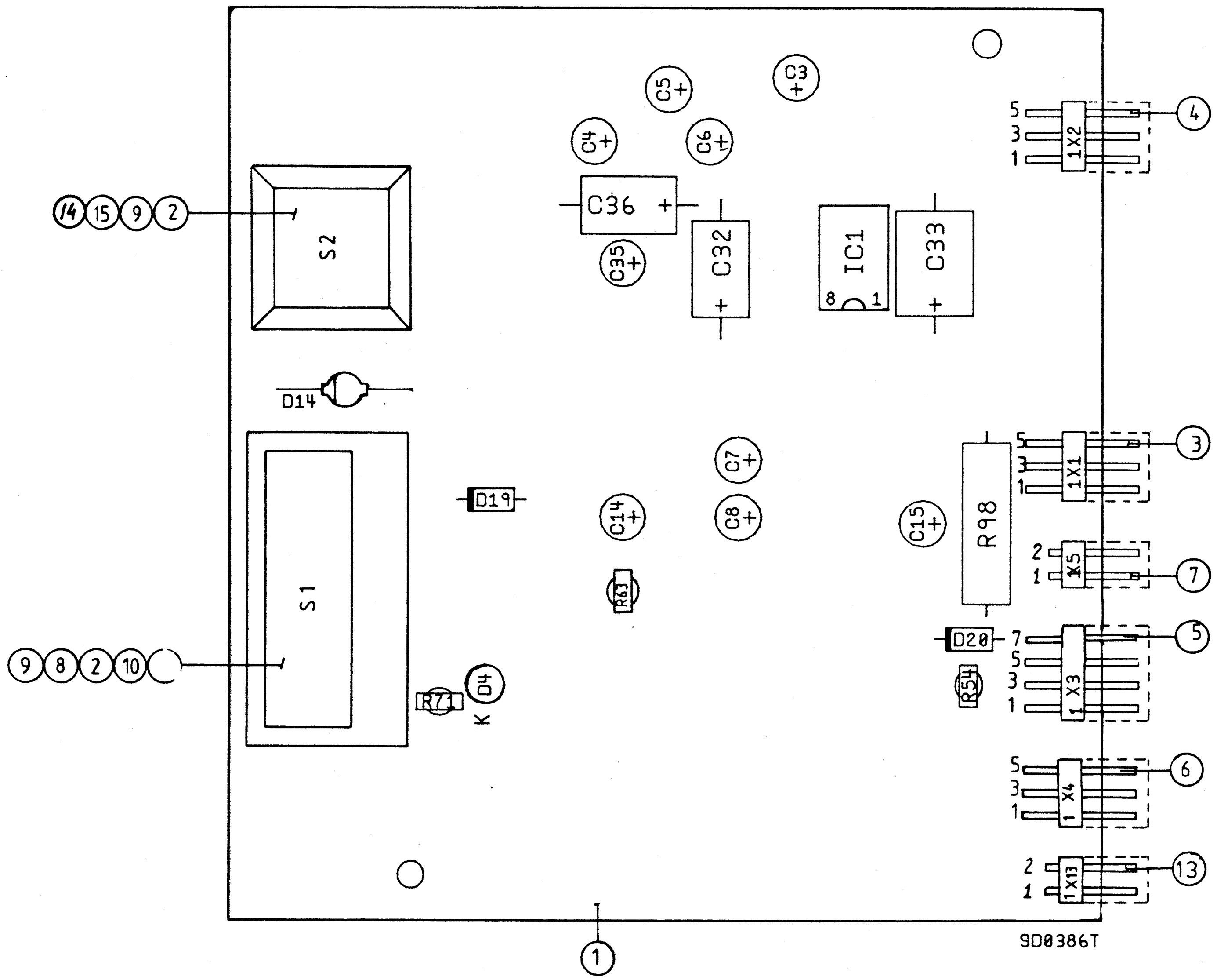

D12
BAV70
R2
22k
R3
10k
C1
0,47µ
TS2
BC857C
D13
BZX84
B9V1
D 10
BAV70
D11
BAV70
R1
22k
D1
D2
D3
D4
4x
CQW24
K1
TS1
BC847C
X1-6
X1-2
X1-1
X1-5
X1-4
+15V
0V
S
L
BC857C
BC847C
b
e
c
a
k
nc
BZX84
BAV70
CQW24


144,5 max.
D4
K1
D3
D2
D1
C1
1
PC BOARD
PRENTPANEEL
3922 151 91000
R2
R3
TS2
D12
D13
R1
D10
D11
TS1
N1
N2
N3
N4
N5
N6
N7

## LOCATIONS OF COMPONENTS OF CHAIRMANS UNIT

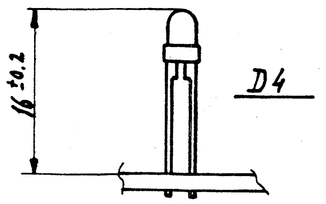

R1
R89
C1
R4
C2
R87
R9
R6
R8
R5
R7
D2
D1
T92
R57
R103
R56
R102
R3
T91
R2
R22
R97
R18
C13
R14
C48
C12
C11
R11
R21
T94
D9
T96
T97
R12
R16
T95
R13
R94
R19
R20
C9
C10
C44
R15
R61
R62
R66
R65
T911
C47
C39
T910
C37
R46
C28
R42
R23
R17
R25
D5
R24
R58
D15
R59
IC5
R55
R60
C30
R44
D10
R45
R75
D16
R51
D11
C25
IC3
R37
R91
R92
T98
D12
R50
R52
R53
R49
R93
C31
R70
C38
IC6
R68
R67
R72
C40
R48
R69

SD0386B

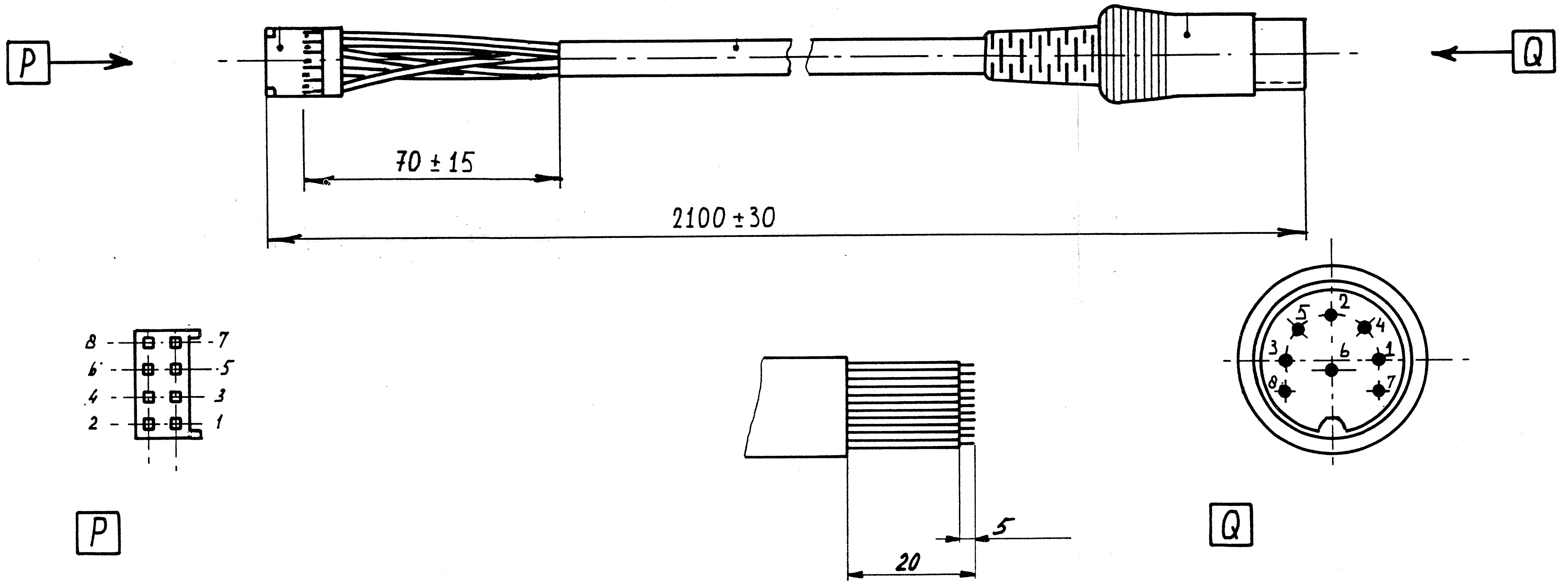

C3
C5
C4
C6
C36
C32
C35
IC1
8
1
C33
S2
14
15
9
2
D14
S1
9
8
2
10
D19
C7
C14
C8
C15
R98
R63
D20
R54
R71
D4
K
1X2
4
1X1
3
X5
7
X3
5
X4
6
1X13
13
1

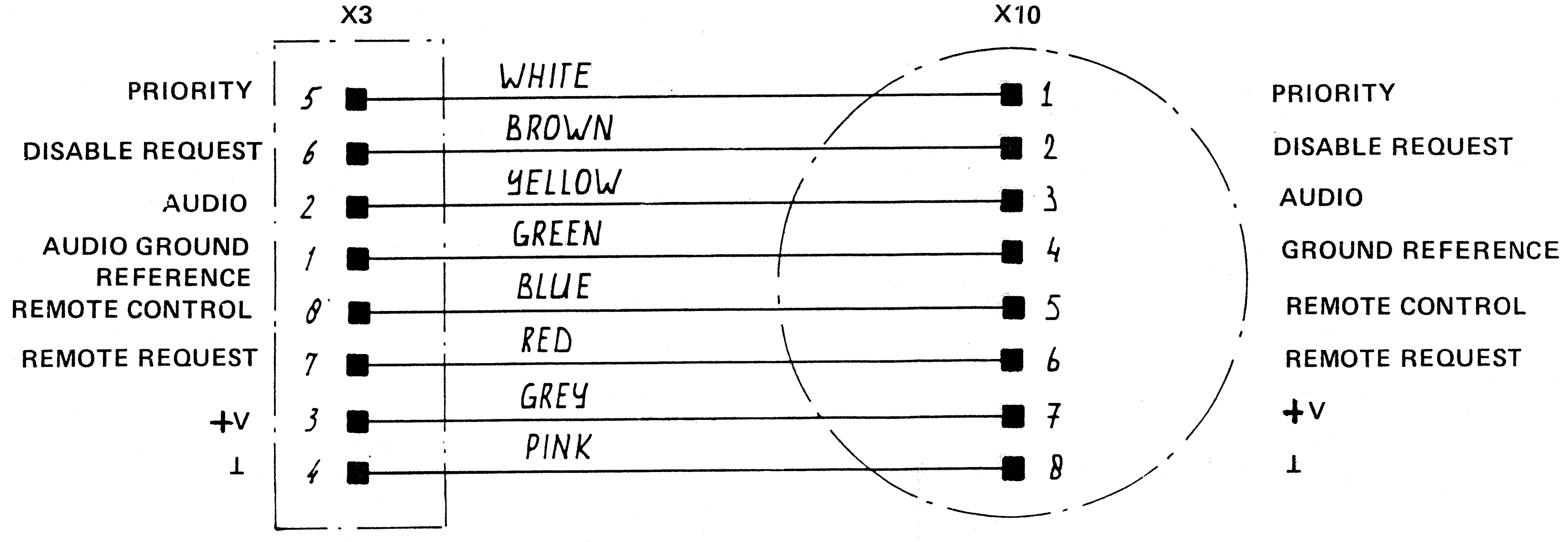
SD0386T

PC BOARD / PRENTPANEEL 3922 151 90850

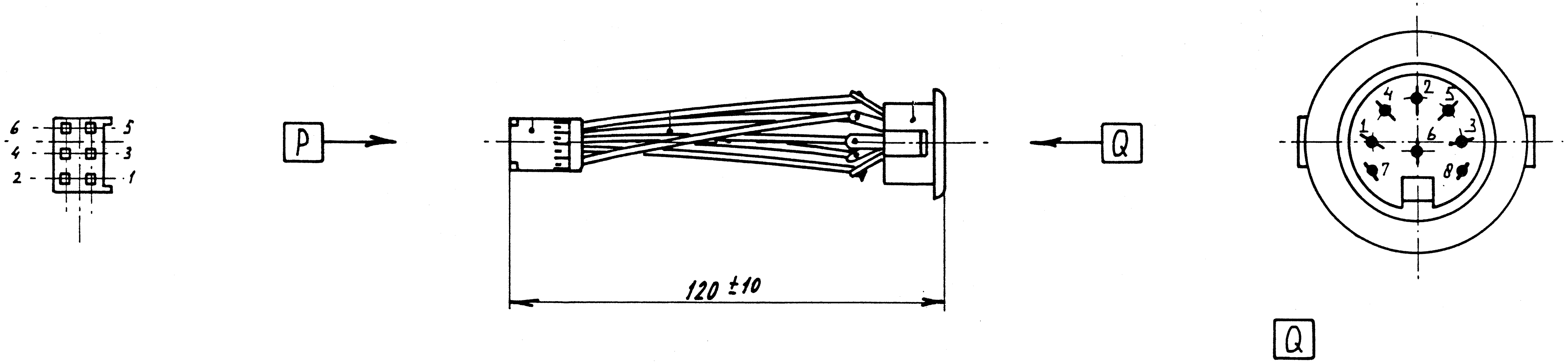


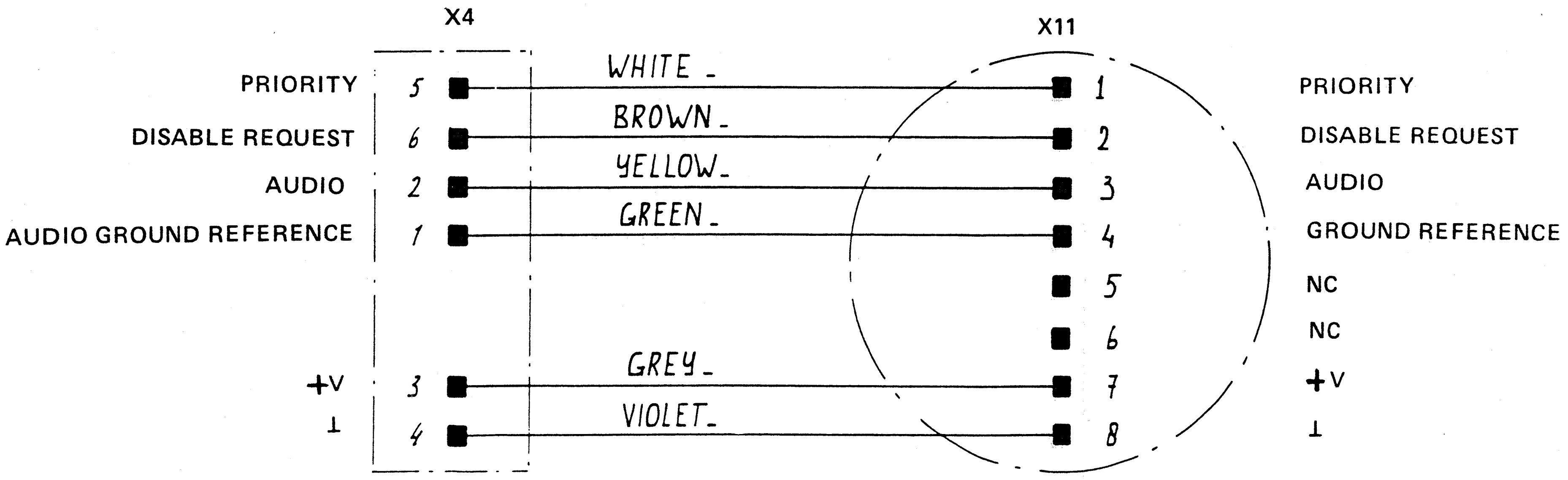
## CONNECTIONS, CHAIRMANS UNIT CABLE ASSEMBLY


P
Q
70 ± 15
2100 ± 30
8
7
6
5
4
3
2
1
P
20
5
Q
5
2
4
3
6
1
8
7

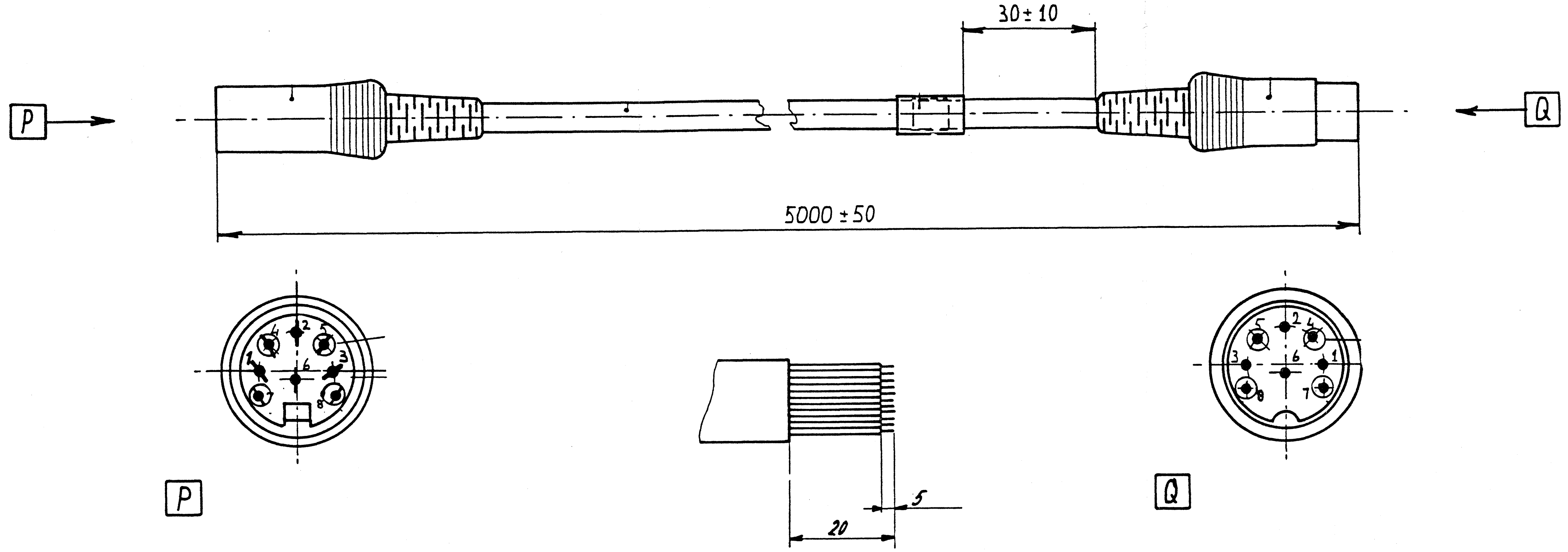

X3
X10
PRIORITY
5
WHITE
1
PRIORITY
DISABLE REQUEST
6
BROWN
2
DISABLE REQUEST
AUDIO
2
YELLOW
3
AUDIO
AUDIO GROUND REFERENCE
1
GREEN
4
GROUND REFERENCE
REMOTE CONTROL
8
BLUE
5
REMOTE CONTROL
REMOTE REQUEST
7
RED
6
REMOTE REQUEST
+V
3
GREY
7
+V
⊥
4
PINK
8
⊥

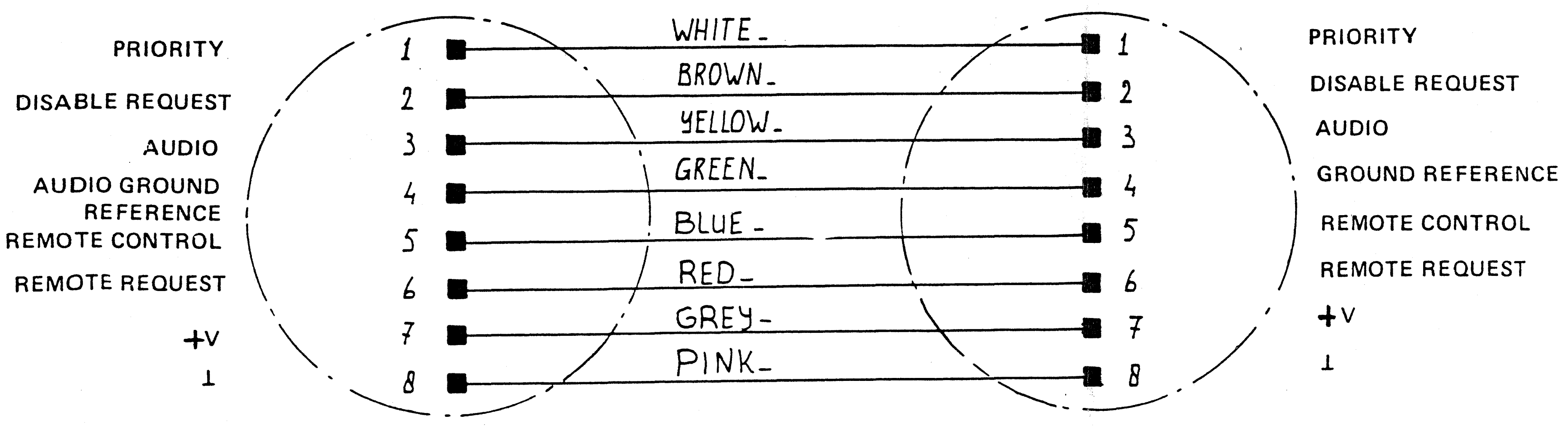
CONNECTIONS, CHAIRMANS UNIT CABLE ASSEMBLY INSIDE


6
5
4
3
2
1
P
120 ±10
Q
4 2 5
1 6 3
7 8
Q


X4
X11
PRIORITY
DISABLE REQUEST
AUDIO
AUDIO GROUND REFERENCE
+V
⊥
5
6
2
1
3
4
WHITE
BROWN
YELLOW
GREEN
GREY
VIOLET
1
2
3
4
5
6
7
8
PRIORITY
DISABLE REQUEST
AUDIO
GROUND REFERENCE
NC
NC
+V
⊥

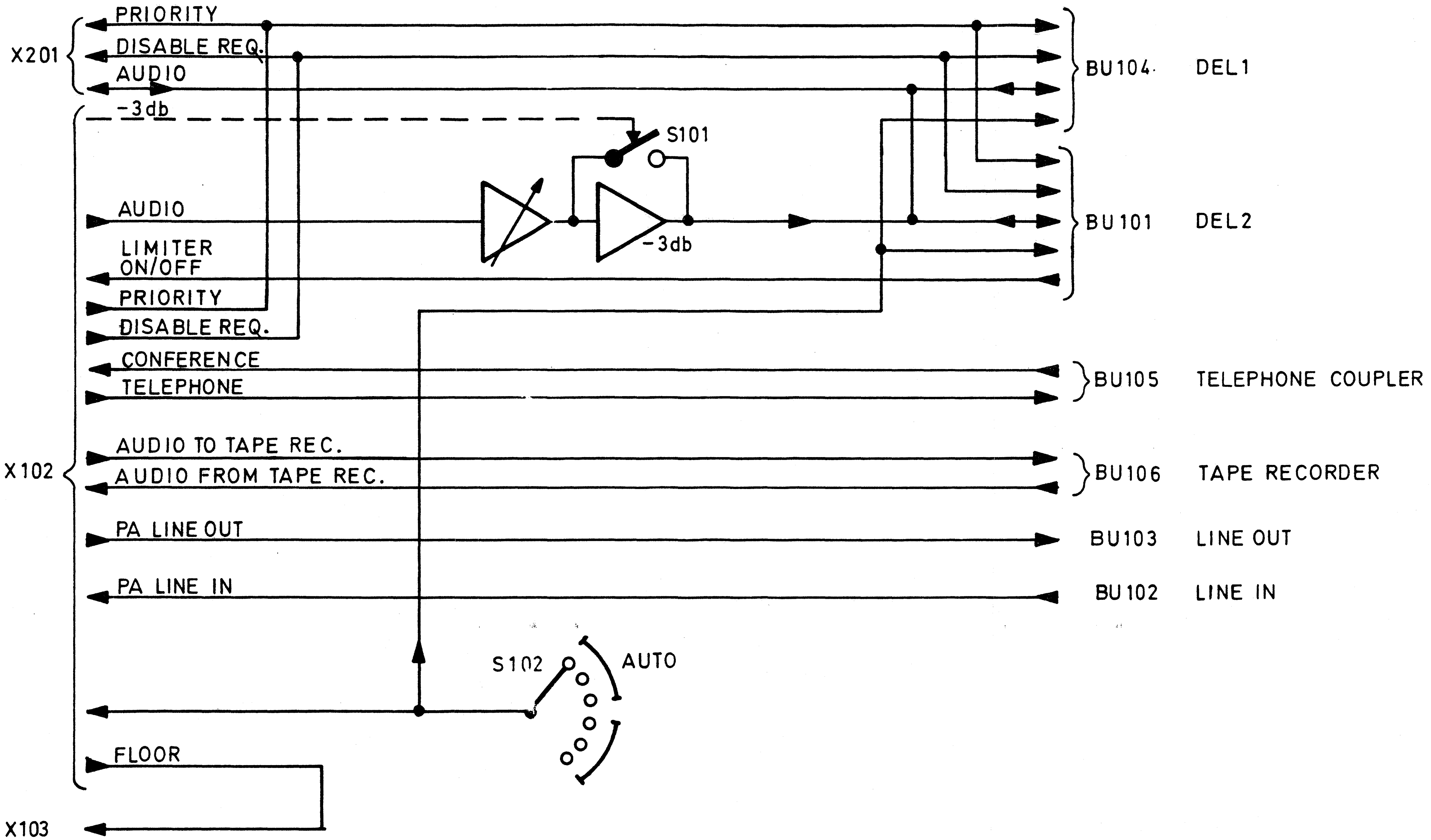
**EXTENSION CABLE LBB 3305/00**


P
Q
30 ± 10
5000 ± 50
1
2
3
4
5
6
7
8
P
Q
20
5


PRIORITY
DISABLE REQUEST
AUDIO
AUDIO GROUND REFERENCE
REMOTE CONTROL
REMOTE REQUEST
+V
⊥
1 WHITE 1
2 BROWN 2
3 YELLOW 3
4 GREEN 4
5 BLUE 5
6 RED 6
7 GREY 7
8 PINK 8
PRIORITY
DISABLE REQUEST
AUDIO
GROUND REFERENCE
REMOTE CONTROL
REMOTE REQUEST
+V
⊥

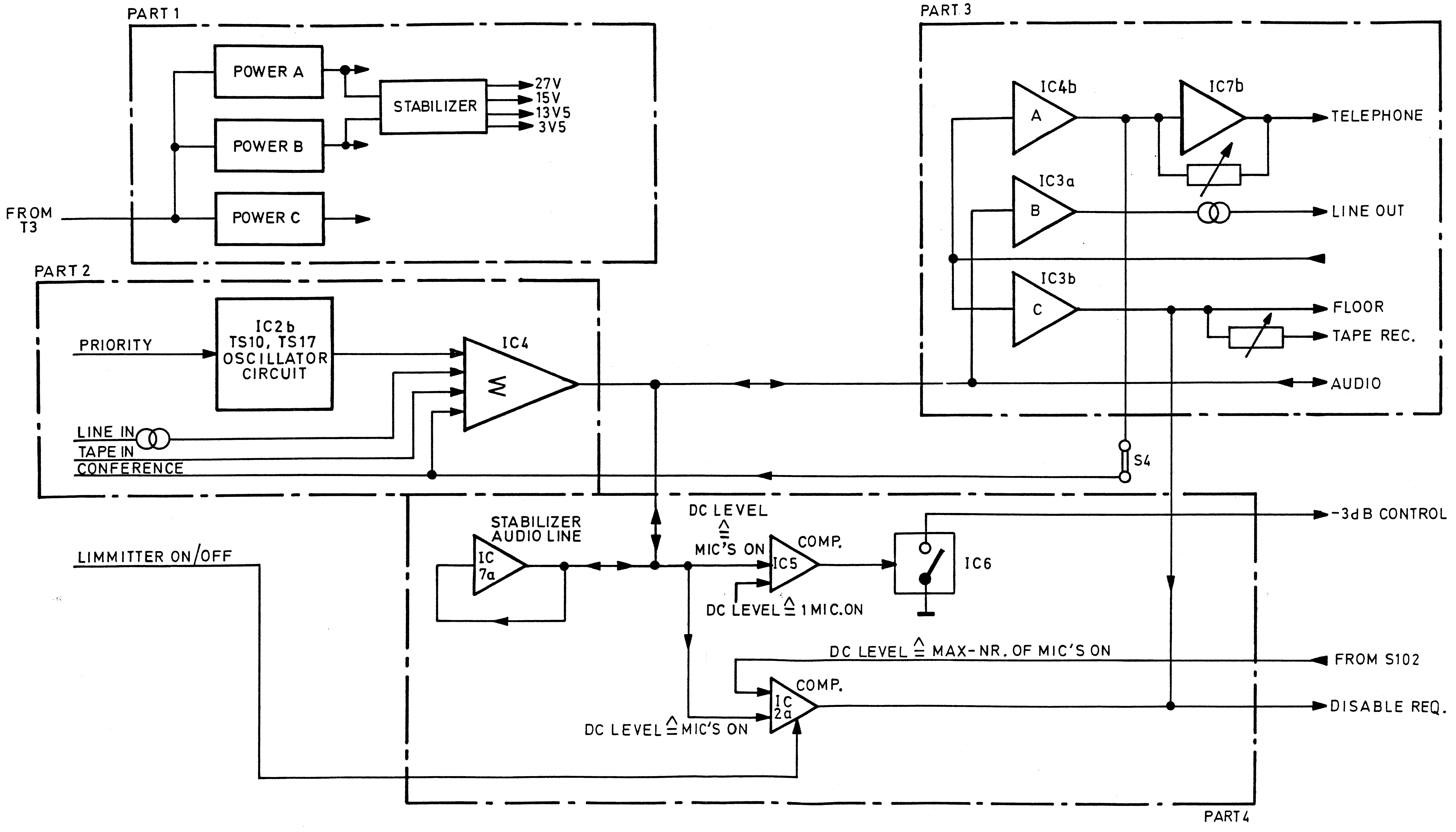
Chapter 3 Fig. 5 c

DETAILED BLOCK DIAGRAM CONNECTOR PANEL

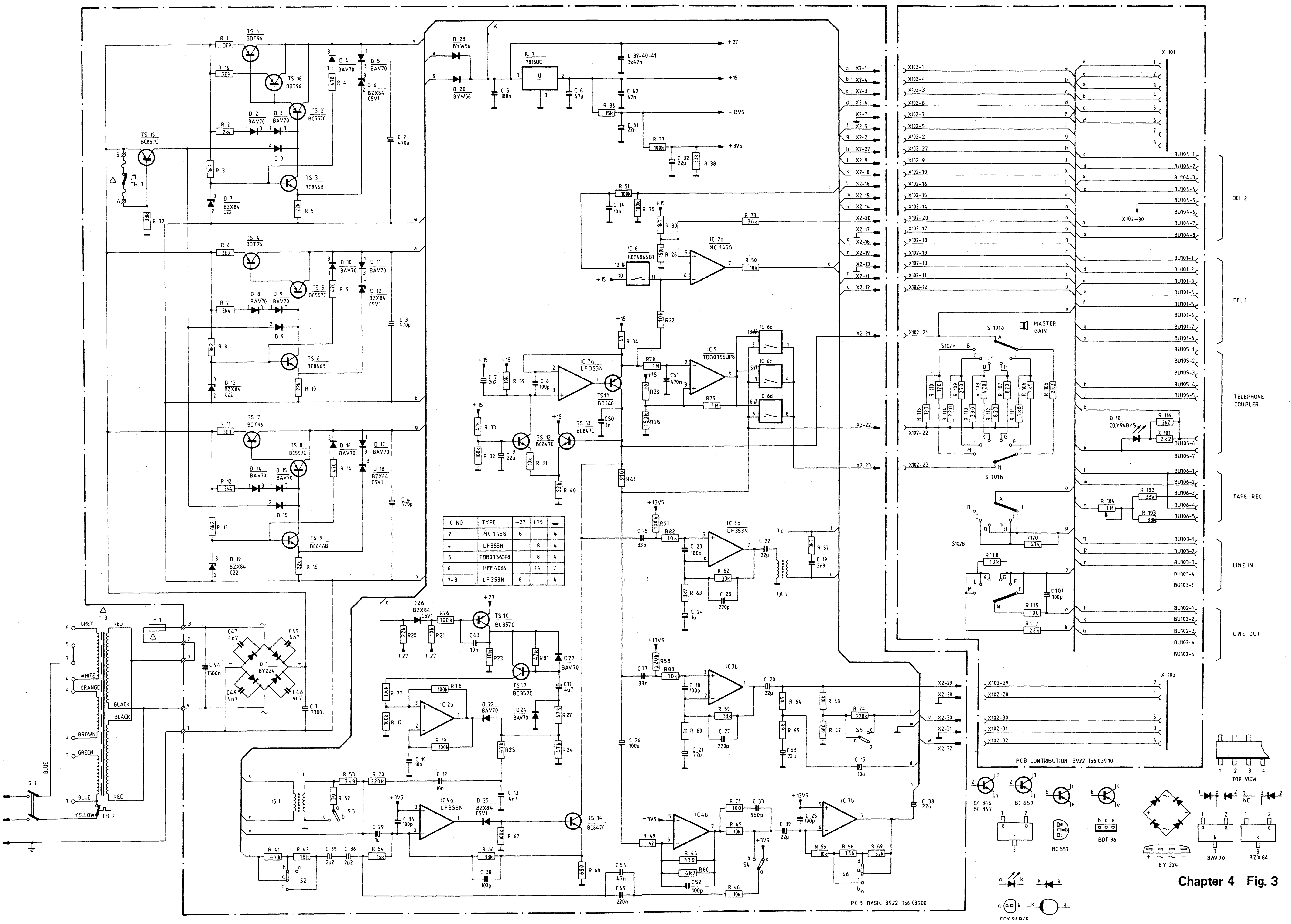

X201
PRIORITY
DISABLE REQ.
AUDIO
-3db
S101
AUDIO
LIMITER ON/OFF
PRIORITY
DISABLE REQ.
CONFERENCE
TELEPHONE
AUDIO TO TAPE REC.
AUDIO FROM TAPE REC.
PA LINE OUT
PA LINE IN
X102
-3db
S102
AUTO
FLOOR
X103
BU104 DEL1
BU101 DEL2
BU105 TELEPHONE COUPLER
BU106 TAPE RECORDER
BU103 LINE OUT
BU102 LINE IN

Chapter 4 Fig. 1

# DETAILED BLOCK DIAGRAM BASIC P.C.B.


PART 1
POWER A
POWER B
POWER C
STABILIZER
27V
15V
13V5
3V5
FROM T3
PART 2
IC2b TS10, TS17 OSCILLATOR CIRCUIT
PRIORITY
IC4
LINE IN
TAPE IN
CONFERENCE
PART 3
IC4b
A
IC7b
TELEPHONE
IC3a
B
LINE OUT
IC3b
C
FLOOR
TAPE REC.
AUDIO
S4
STABILIZER AUDIO LINE
IC 7a
DC LEVEL ≙ MIC'S ON
COMP.
IC5
DC LEVEL ≙ 1 MIC.ON
IC6
-3dB CONTROL
DC LEVEL ≙ MAX-NR. OF MIC'S ON
FROM S102
COMP.
IC 2a
DISABLE REQ.
DC LEVEL ≙ MIC'S ON
LIMMITTER ON/OFF
PART 4

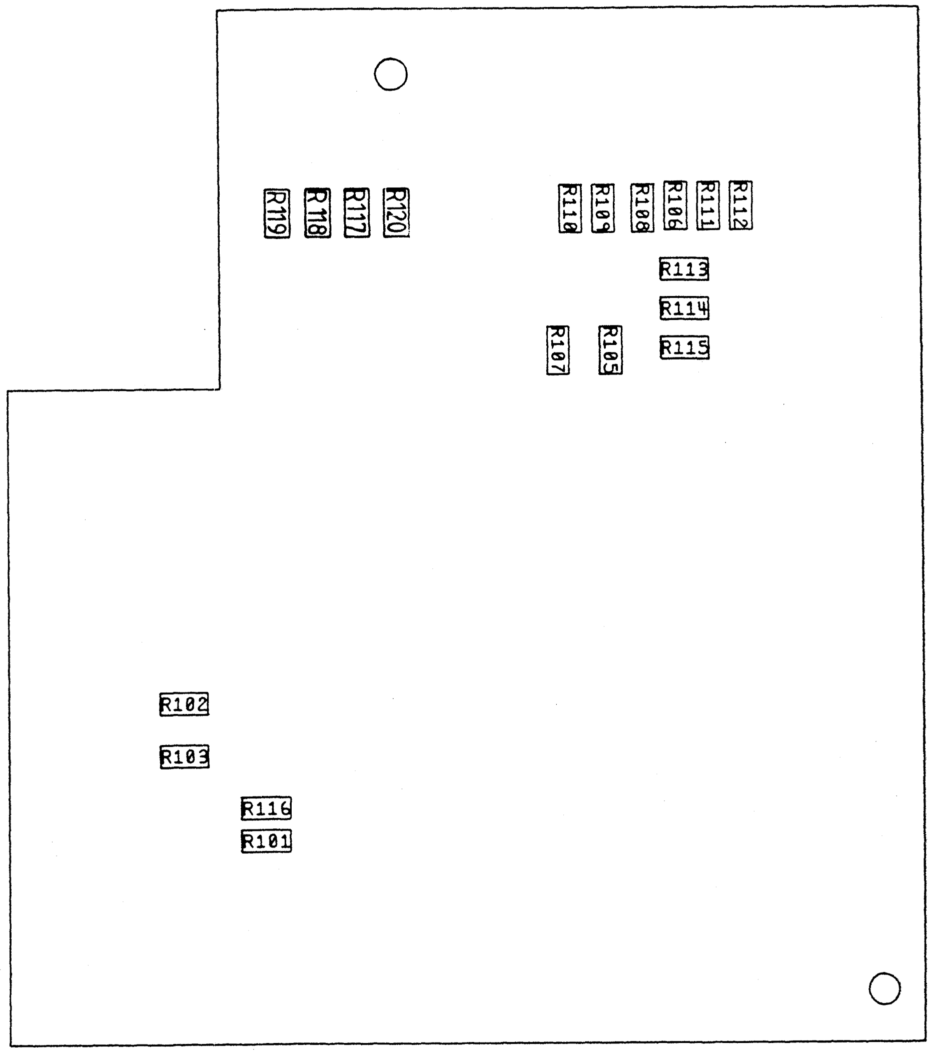
# CIRCUIT DIAGRAM CONNECTOR PANEL AND BASIC P.C.B.


TS 1 BDT96
TS 16 BDT96
TS 2 BC557C
TS 3 BC846B
TS 15 BC857C
TH 1
TS 4 BDT96
TS 5 BC557C
TS 6 BC846B
TS 7 BDT96
TS 8 BC557C
TS 9 BC846B
D 23 BYW56
D 20 BYW56
IC 1 7815UC
+27
+15
+13V5
+3V5
IC 6 HEF4066BT
IC 2a MC 1458
IC 7a LF 353N
TS11 BD140
TS 12 BC847C
TS 13 BC847C
IC 5 TDB0156DP8
IC 6b
IC 6c
IC 6d
IC 3a LF353N
T2
1,8:1
IC 3b
TS 10 BC857C
TS17 BC857C
IC 2b
IC 4a LF353N
TS 14 BC847C
IC 4b
IC 7b
T 1
15:1
S 1
S2
S3
S4
S5
S6
T 3
F 1
D 1 BY224
GREY
WHITE
ORANGE
BROWN
GREEN
BLUE
YELLOW
RED
BLACK
TH 2
X 101
X 103
MASTER GAIN
S 101a
S 101b
S102A
S102B
D 10 CQY94B/5
DEL 2
DEL 1
TELEPHONE COUPLER
TAPE REC
LINE IN
LINE OUT
PCB CONTRIBUTION 3922 156 03910
PCB BASIC 3922 156 03900
TOP VIEW
BC 846 BC 847
BC 857
BC 557
BDT 96
BAV 70
BZX 84
BY 224
CQY 94B/5

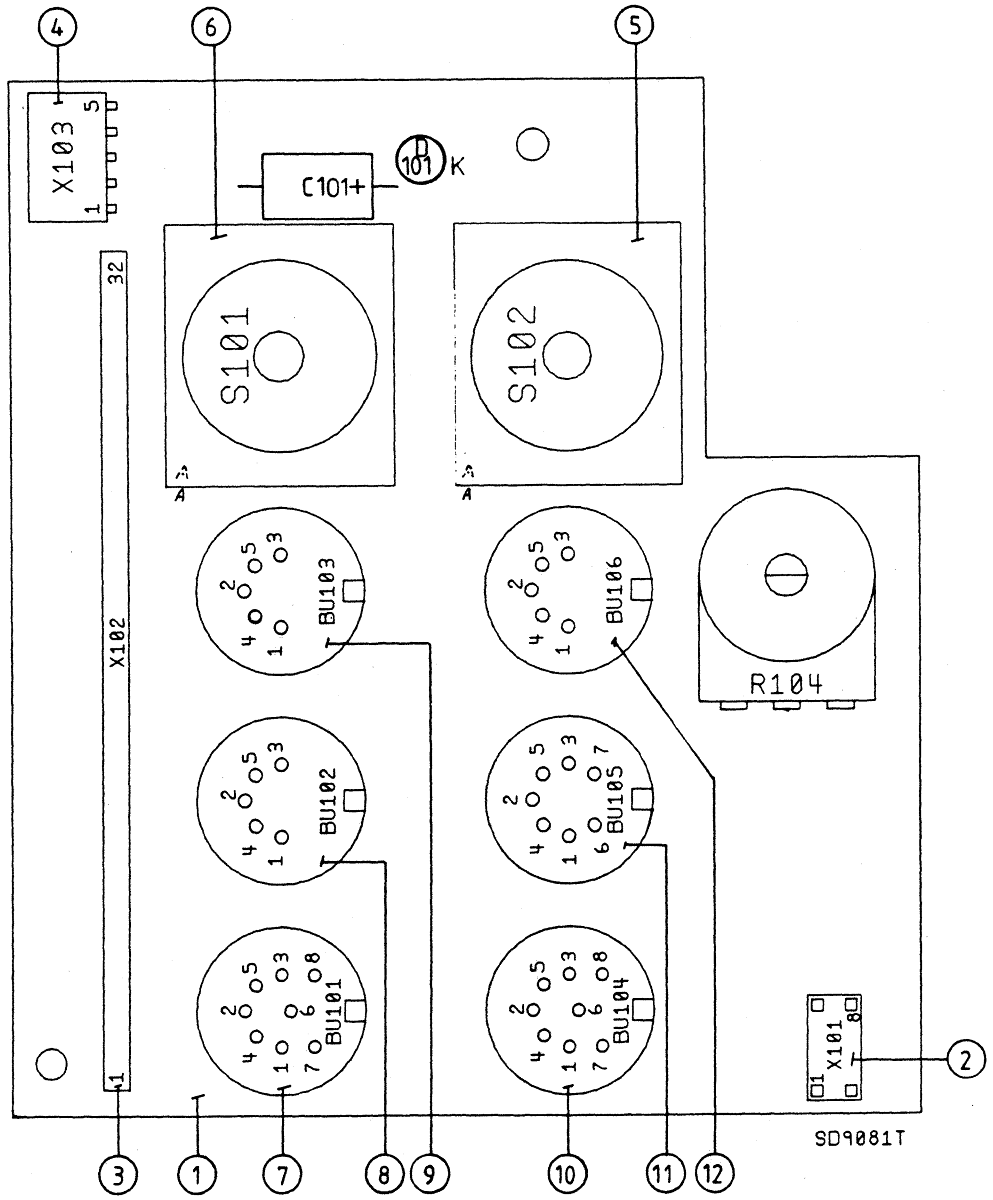
| IC NO | TYPE | +27 | +15 | ⊥ |
|---|---|---|---|---|
| 2 | MC 1458 | 8 |  | 4 |
| 4 | LF 353N |  | 8 | 4 |
| 5 | TDB0156DP8 |  | 8 | 4 |
| 6 | HEF 4066 |  | 14 | 7 |
| 7-3 | LF 353N | 8 |  | 4 |

**Chapter 4 Fig. 3**

LOCATION OF COMPONENTS OF CONNECTOR PANEL


R119
R118
R117
R120
R110
R109
R108
R106
R111
R112
R113
R114
R115
R107
R105
R102
R103
R116
R101

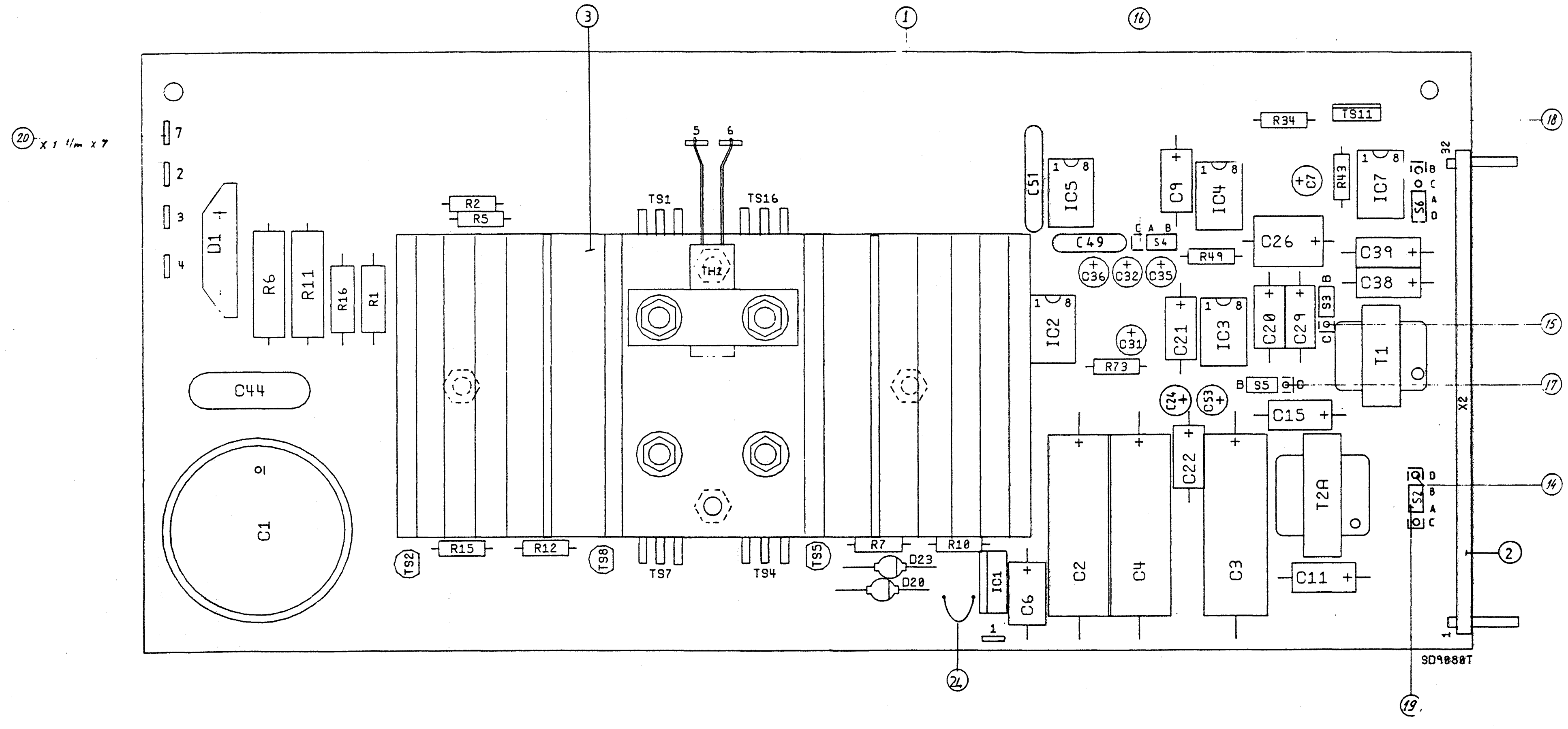
SD9081B

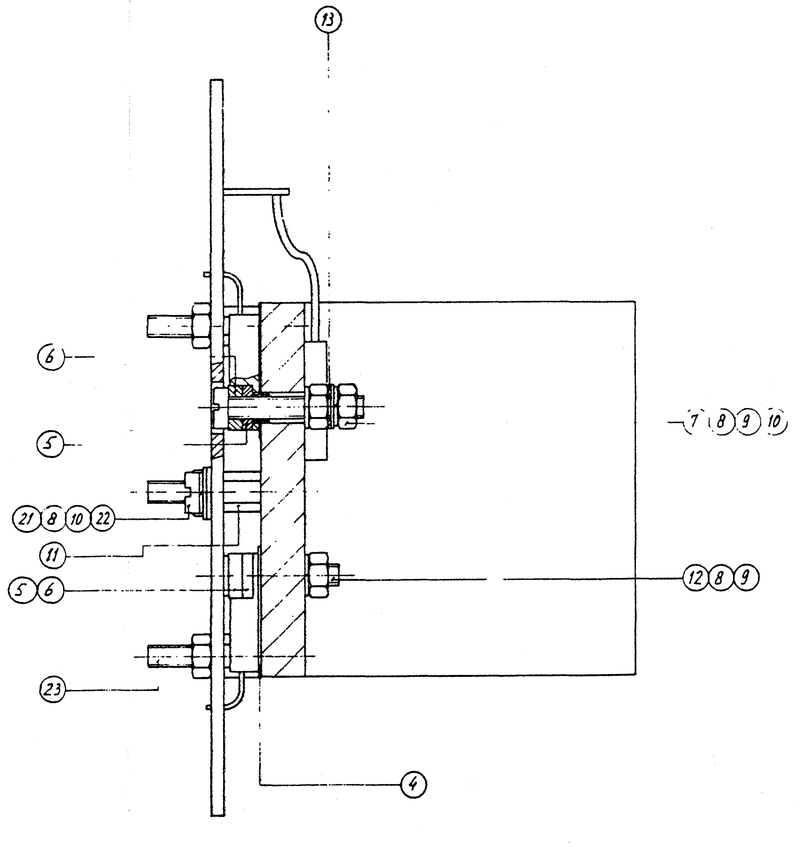

4
6
5
X103
5
1
C101+
D 101 K
32
X102
1
S101
S102
A
A
BU103
BU106
R104
BU102
BU105
BU101
BU104
X101
2
3
1
7
8
9
10
11
12

SD9081T

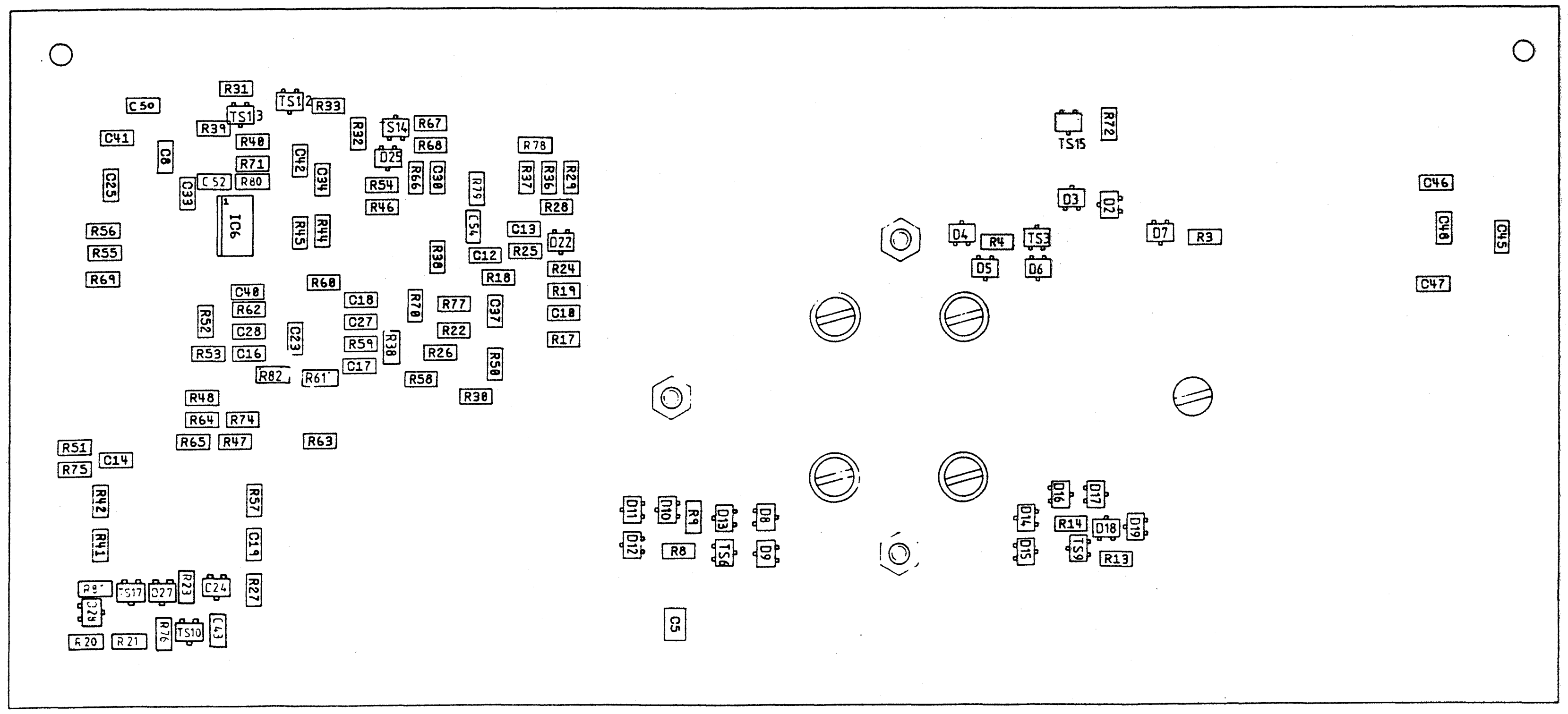
PC BOARD
PRENTPANEEL 3922 151 90810

## LOCATION OF COMPONENTS BASIC P.C.B.


③
①
⑯
⑳ x 1 ¹/m x 7
⑱
⑮
⑰
⑭
②
㉑
⑲
D1
R6
R11
R16
R1
R2
R5
TS1
TS16
TH2
C44
C1
R15
R12
TS2
TS8
TS7
TS4
TS5
R7
R10
D23
D20
IC1
C6
C2
C4
C3
C51
IC5
C49
S4
C36
C32
C35
C9
IC4
R34
TS11
C7
R43
IC7
S6
C26
R49
C39
C38
IC2
C31
R73
C21
IC3
C20
C29
S3
T1
S5
C24
C53
C15
C22
T2A
S2
C11
X2
9D9080T


⑬
⑥
⑤
㉑⑧⑩㉒
⑪
⑤⑥
㉓
④
⑦⑧⑨⑩
⑫⑧⑨

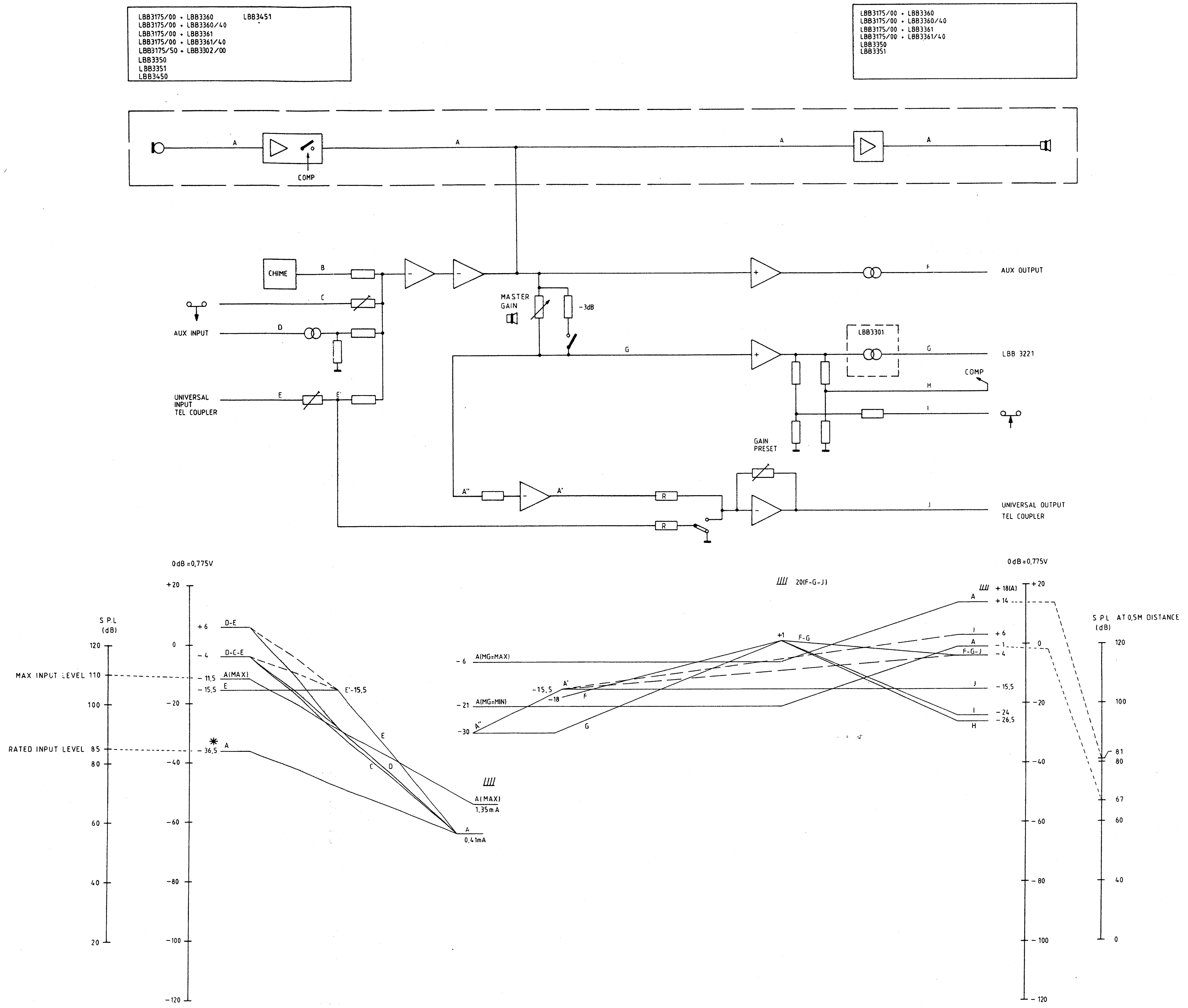
AANDRAAIKOPPEL VAN DE BEVESTIGINGSSCHOEVEN
VAN TS1-4-7-16 : 0,55-0,8 Nm


C50
R31
TS12
R33
C41
R39
TS13
R32
TS14
R67
C8
R40
R68
C25
C33
C52
R80
R71
C42
C34
D25
R66
C30
R79
R78
R37
R36
R29
IC6
R54
R46
R28
R56
R55
R69
R45
R44
C54
C13
R25
D22
R38
C12
R24
R60
R18
R19
C48
R62
C18
R70
R77
C37
C10
R52
C28
C23
C27
R22
R17
R53
C16
R59
R26
R50
R82
R61
C17
R58
R30
R48
R64
R74
R65
R47
R63
R51
C14
R75
R42
R57
R41
C19
R27
TS17
D27
C24
R20
R21
TS10
L1
TS15
R72
D3
D2
D4
R4
TS3
D7
R3
D5
D6
C46
C48
C45
C47
D11
D10
R9
D13
D8
D12
R8
TS6
D9
C5
D16
D17
D14
R14
D18
D19
D15
TS9
R13

9D9080B

3922 151 90800 PC BOARD / PRENTPANEEL

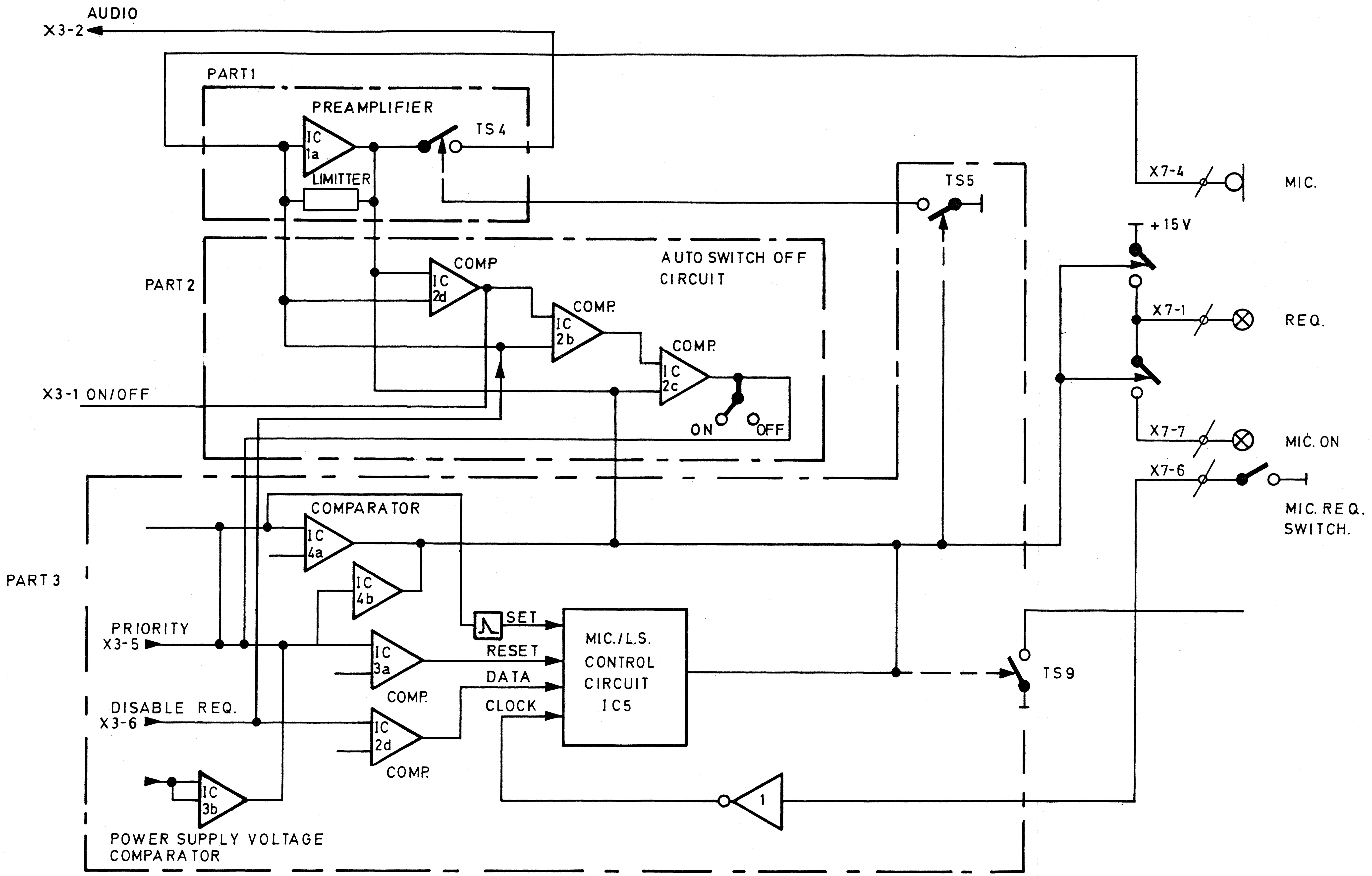
# LEVEL DIAGRAM CCS400


LBB3175/00 + LBB3360
LBB3175/00 + LBB3360/40
LBB3175/00 + LBB3361
LBB3175/00 + LBB3361/40
LBB3175/50 + LBB3302/00
LBB3350
LBB3351
LBB3450
LBB3451
LBB3175/00 + LBB3360
LBB3175/00 + LBB3360/40
LBB3175/00 + LBB3361
LBB3175/00 + LBB3361/40
LBB3350
LBB3351
A
COMP
CHIME
B
C
D
E
E'
AUX INPUT
UNIVERSAL INPUT TEL COUPLER
MASTER GAIN
-3dB
AUX OUTPUT
F
G
LBB3301
LBB 3221
COMP
H
I
GAIN PRESET
A''
A'
R
J
UNIVERSAL OUTPUT TEL COUPLER
0dB = 0,775V
S P.L (dB)
MAX INPUT LEVEL 110
RATED INPUT LEVEL 85
+20
+6 D-E
-4 D-C-E
-11,5 A(MAX)
-15,5 E
-36,5 A
E'-15,5
A(MAX) 1,35mA
A 0,41mA
-6 A(MG=MAX)
-21 A(MG=MIN)
-30 A''
-15,5 A'
-18 F
+1 F-G
20(F-G-J)
+18(A)
A +14
J +6
A -1
F-G-J -4
J -15,5
I -24
H -26,5
S PL AT 0,5M DISTANCE (dB)
120
100
81
80
67
60
40
20
0
-20
-40
-60
-80
-100
-120

THE VALUES STATED IN THIS LEVEL DIAGRAM ARE TYPICAL VALUES
FOR EXACT VALUES SEE SHEET 190-3,-4,-5

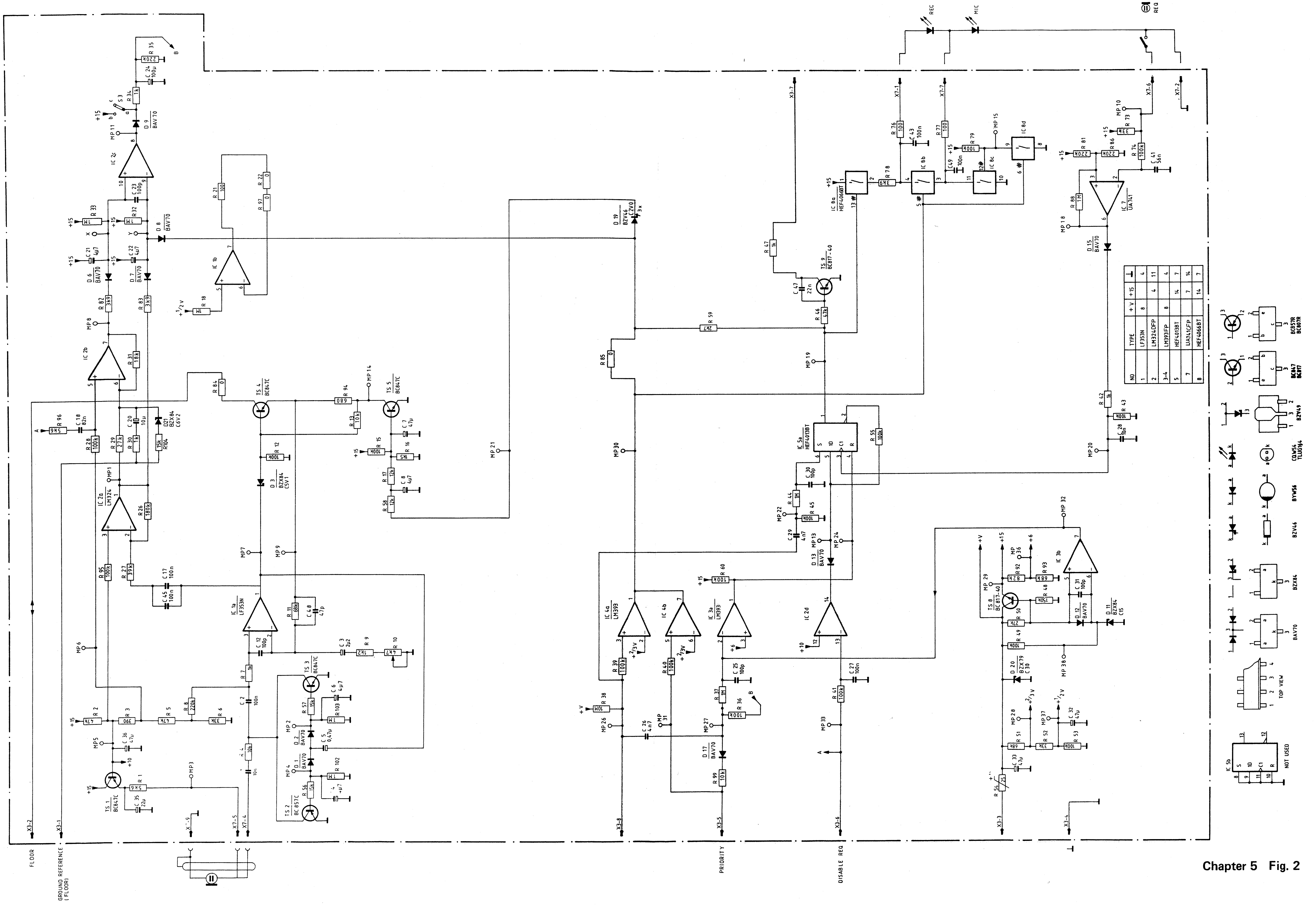
✱ LBB3302/00 -39dB

BLOCK DIAGRAM OF MICROPHONE PLUG IN UNIT



AUDIO
X3-2
PART1
PREAMPLIFIER
IC 1a
TS4
LIMITTER
TS5
X7-4
MIC.
+15V
PART 2
COMP
IC 2d
AUTO SWITCH OFF CIRCUIT
COMP.
IC 2b
COMP.
IC 2c
X7-1
REQ.
X3-1 ON/OFF
ON
OFF
X7-7
MIC. ON
X7-6
MIC. REQ. SWITCH.
COMPARATOR
IC 4a
IC 4b
PART 3
SET
PRIORITY
X3-5
RESET
IC 3a
DATA
MIC./L.S. CONTROL CIRCUIT IC5
TS9
COMP.
DISABLE REQ.
X3-6
CLOCK
IC 2d
COMP.
IC 3b
1
POWER SUPPLY VOLTAGE COMPARATOR

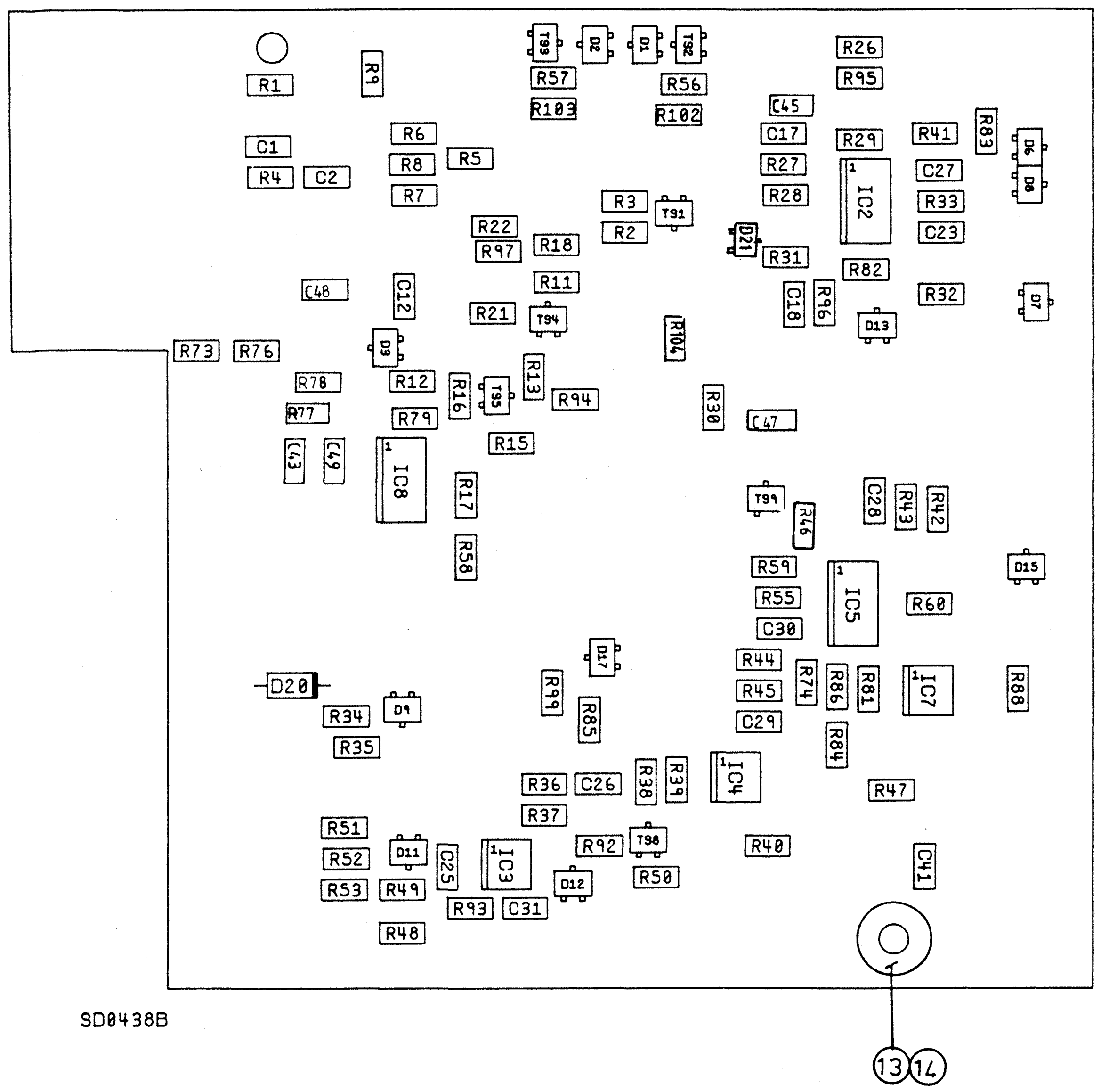
## CIRCUIT DIAGRAM OF MICROPHONE PLUG IN UNIT


REC
MIC
REQ
IC 1a LF353N
IC 1b
IC 2a LM324
IC 2b
IC 2c
IC 2d
IC 3a LM393
IC 3b
IC 4a LM393
IC 4b
IC 5a HEF4013BT
IC 5b NOT USED
IC 7 UA741
IC 8a HEF4066BT
IC 8b
IC 8c
IC 8d
TS 1 BC847C
TS 2 BC857C
TS 3 BC847C
TS 4 BC847C
TS 5 BC847C
TS 8 BC817-40
TS 9 BC817-40
D 19 BZV46 C2V0
D 21 BZX84 C6V2
D 3 BZX84 C5V1
D 20 BZX79 C30
D 11 BZX84 C15
X3-1
X3-2
X3-3
X3-4
X3-5
X3-6
X3-7
X3-8
X7-1
X7-2
X7-4
X7-5
X7-6
X7-7
X7-9
FLOOR
GROUND REFERENCE (FLOOR)
PRIORITY
DISABLE REQ
BC857R BC807R
BC847 BC817
BZV49
CQW54 TLUG164
BYW56
BZV46
BZX84
BAV70
TOP VIEW

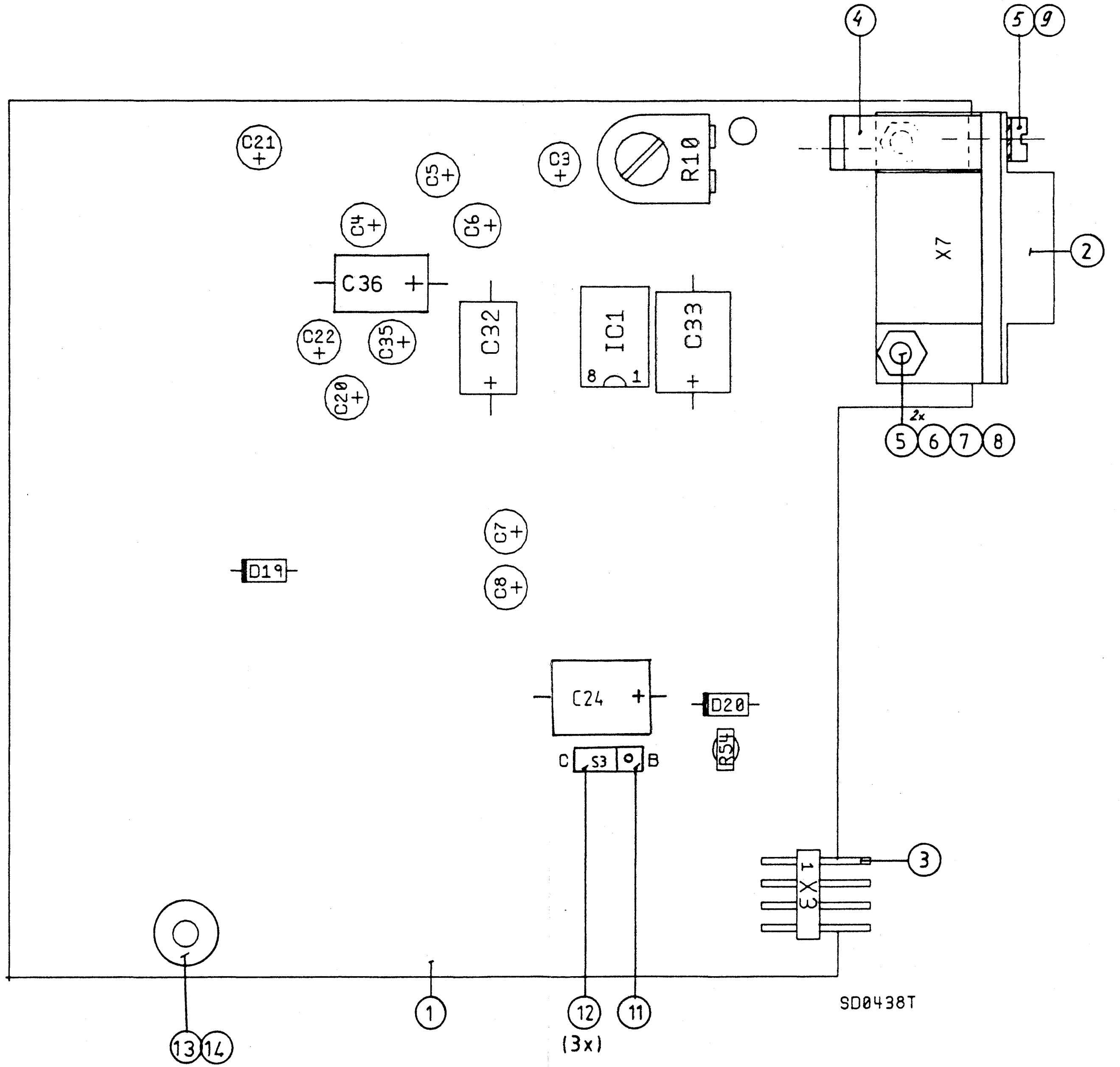
| NO | TYPE | + V | +15 | ⊥ |
|---|---|---|---|---|
| 1 | LF353N | 8 |  | 4 |
| 2 | LM3240FP |  | 4 | 11 |
| 3-4 | LM393FP | 8 |  | 4 |
| 5 | HEF4013BT |  | 14 | 7 |
| 7 | UA741CFP |  | 7 | 14 |
| 8 | HEF4066BT |  | 14 | 7 |

**Chapter 5 Fig. 2**

## LOCATION OF COMPONENTS MICROPHONE PLUG IN UNIT


R1
R9
T99
D2
D1
T92
R57
R56
R103
R102
R26
R95
C45
C17
R29
R41
R83
D6
D8
C1
R6
R5
R4
C2
R8
R7
R27
R28
IC2
C27
R33
C23
R3
T91
R2
D21
R22
R97
R18
R31
R82
R11
C48
C12
R21
T94
C18
R96
D13
R32
D7
R104
R73
R76
D3
R12
R13
R78
R16
T95
R94
R30
C47
R77
R79
R15
C43
C49
IC8
R17
T99
R46
C28
R43
R42
R58
R59
IC5
D15
R55
R60
C30
D17
R44
R74
R86
R81
IC7
R88
D20
R99
R45
R34
D9
R85
C29
R35
R84
R36
C26
R38
R39
IC4
R47
R37
R51
R92
T98
R40
C41
R52
D11
C25
IC3
R50
D12
R53
R49
R93
C31
R48
13
14

SD0438B

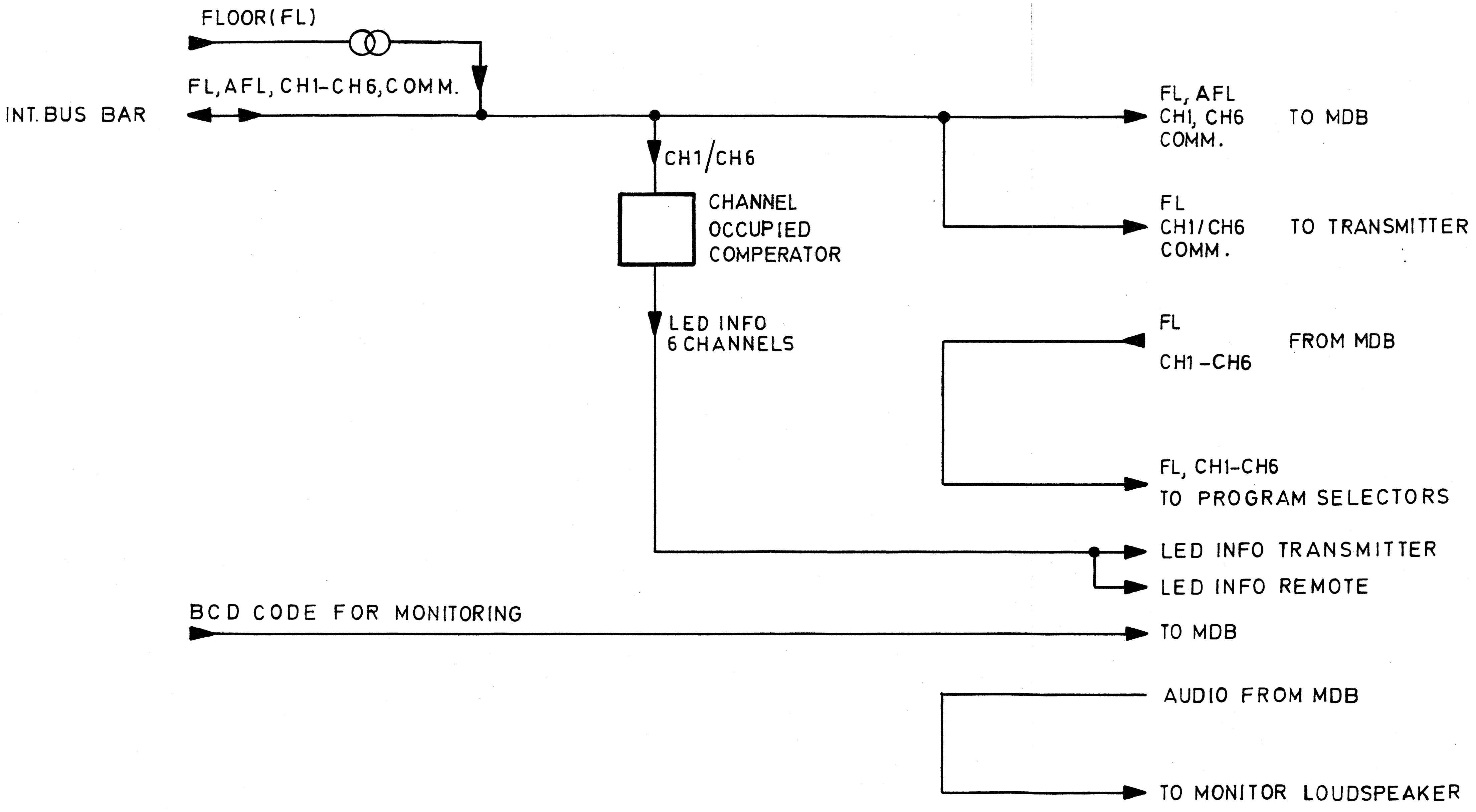

4
5
9
C21
C5
C3
R10
C4
C6
X7
2
C36
C22
C35
C32
IC1
C33
8
1
C20
2x
5
6
7
8
C7
D19
C8
C24
D20
C
S3
B
R54
1X3
3
13
14
1
12
11
(3x)

SD0438T

PC BOARD
PRENTPANEEL 3922 151 90840

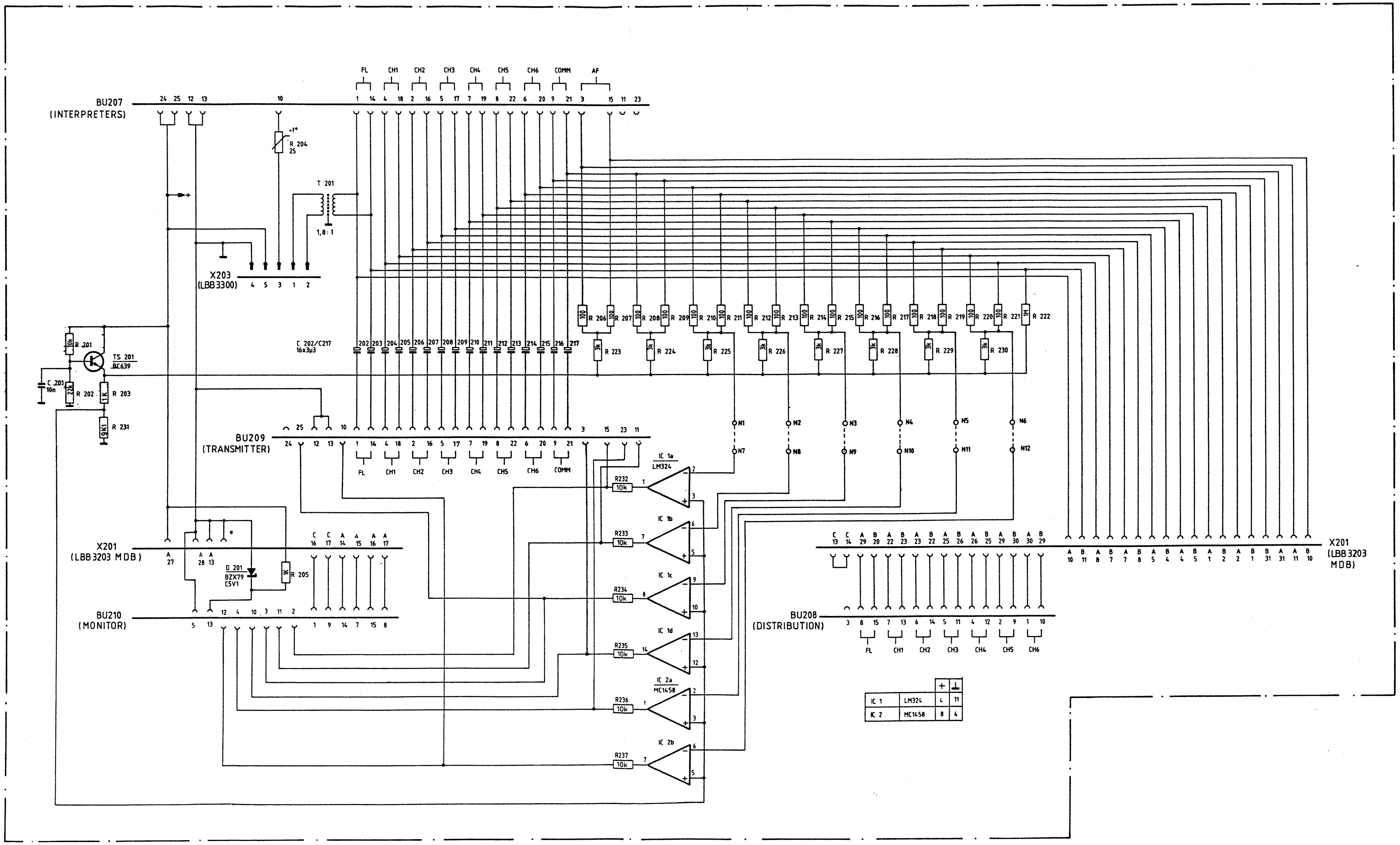
Chapter 5 Fig. 3

## DETAILED BLOCKDIAGRAM OF MONITOR AND INTERPRETERS PANEL


FLOOR(FL)
INT. BUS BAR
FL, AFL, CH1-CH6, COMM.
CH1/CH6
CHANNEL OCCUPIED COMPERATOR
LED INFO 6 CHANNELS
FL, AFL CH1, CH6 COMM.
TO MDB
FL CH1/CH6 COMM.
TO TRANSMITTER
FL CH1-CH6
FROM MDB
FL, CH1-CH6 TO PROGRAM SELECTORS
LED INFO TRANSMITTER
LED INFO REMOTE
BCD CODE FOR MONITORING
TO MDB
AUDIO FROM MDB
TO MONITOR LOUDSPEAKER

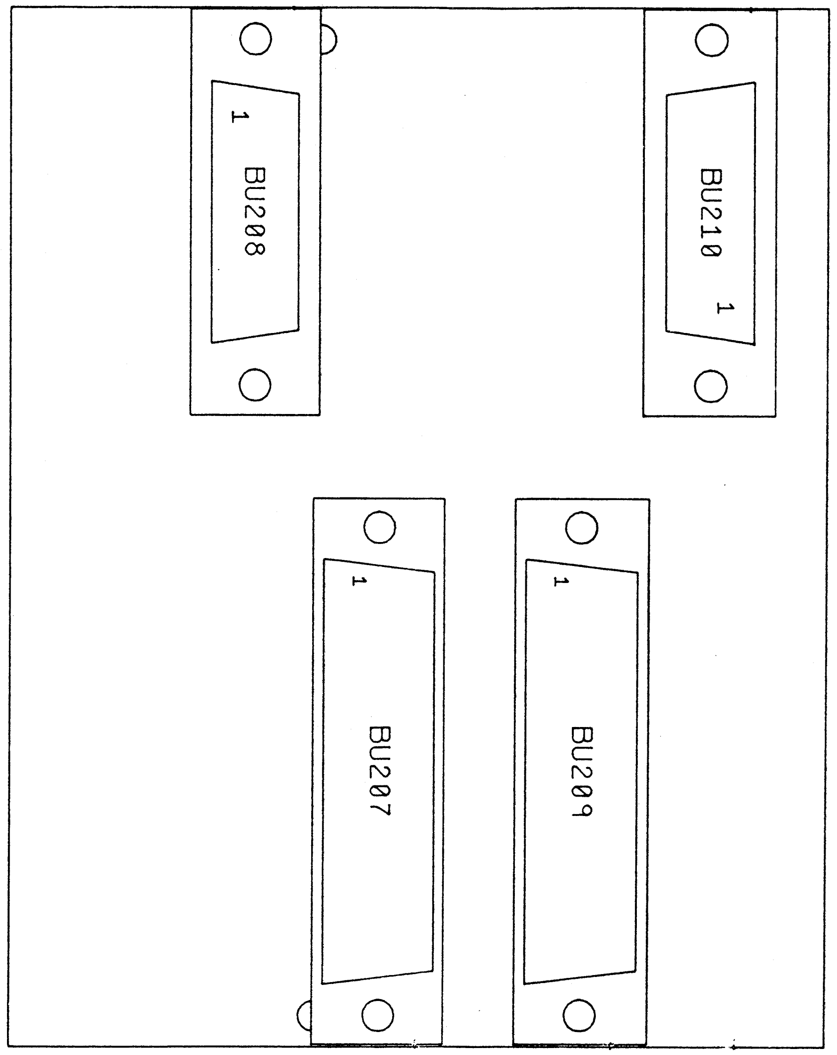
Chapter 6 Fig. 1

# CIRCUIT DIAGRAM OF INT. AND MON. PANEL

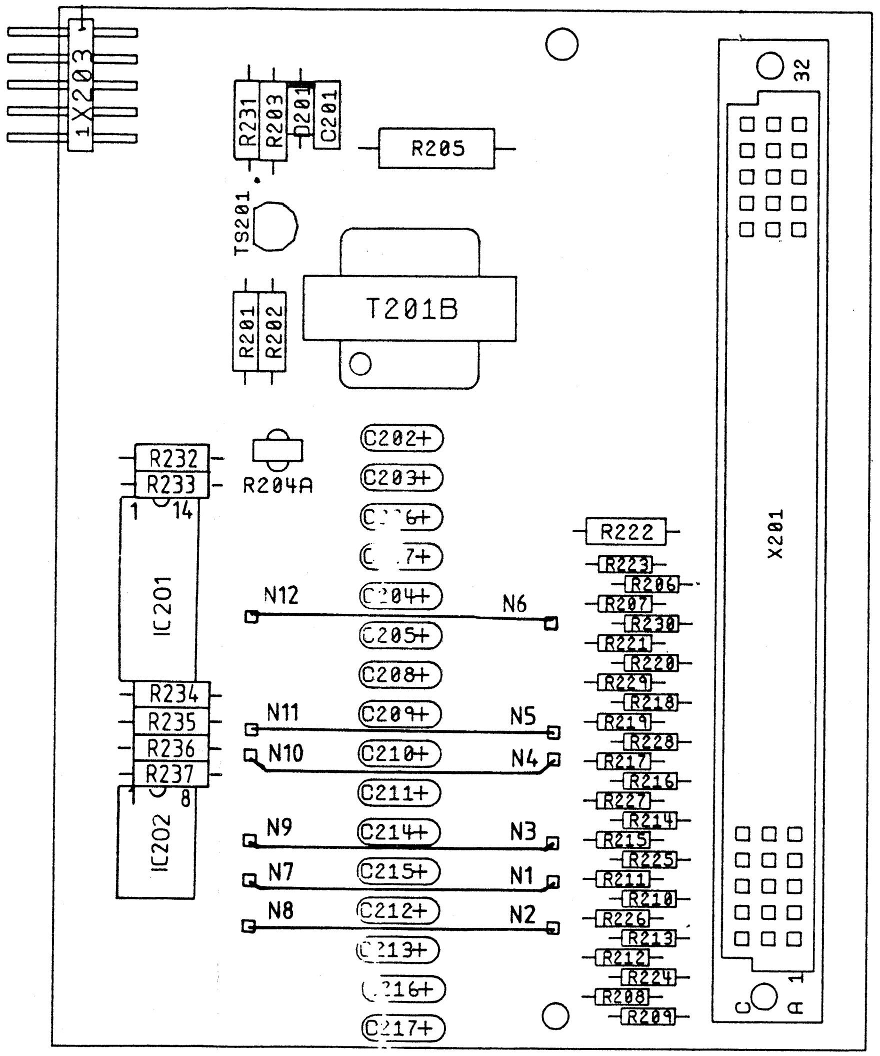

BU207
(INTERPRETERS)
FL
CH1
CH2
CH3
CH4
CH5
CH6
COMM
AF
R 204
25
T 201
1,8 : 1
X203
(LBB3300)
R 201
10k
TS 201
BC639
C 201
10n
R 202
22k
R 203
1K
R 231
9K1
C 202/C217
16x3µ3
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
R 206
R 207
R 208
R 209
R 210
R 211
R 212
R 213
R 214
R 215
R 216
R 217
R 218
R 219
R 220
R 221
R 222
100
R 223
R 224
R 225
R 226
R 227
R 228
R 229
R 230
3k
N1
N2
N3
N4
N5
N6
N7
N8
N9
N10
N11
N12
BU209
(TRANSMITTER)
IC 1a
LM324
IC 1b
IC 1c
IC 1d
IC 2a
MC1458
IC 2b
R232
R233
R234
R235
R236
R237
10k
X201
(LBB3203 MDB)
D 201
BZX79
C5V1
R 205
1K
BU210
(MONITOR)
X201
(LBB 3203
MDB)
BU208
(DISTRIBUTION)

|  |  | + | ⊥ |
|---|---|---|---|
| IC 1 | LM324 | 4 | 11 |
| IC 2 | MC1458 | 8 | 4 |

## LOCATION OF COMPONENTS INT. AND MON. PANEL


BU208
BU210
BU207
BU209
1

SD9082B

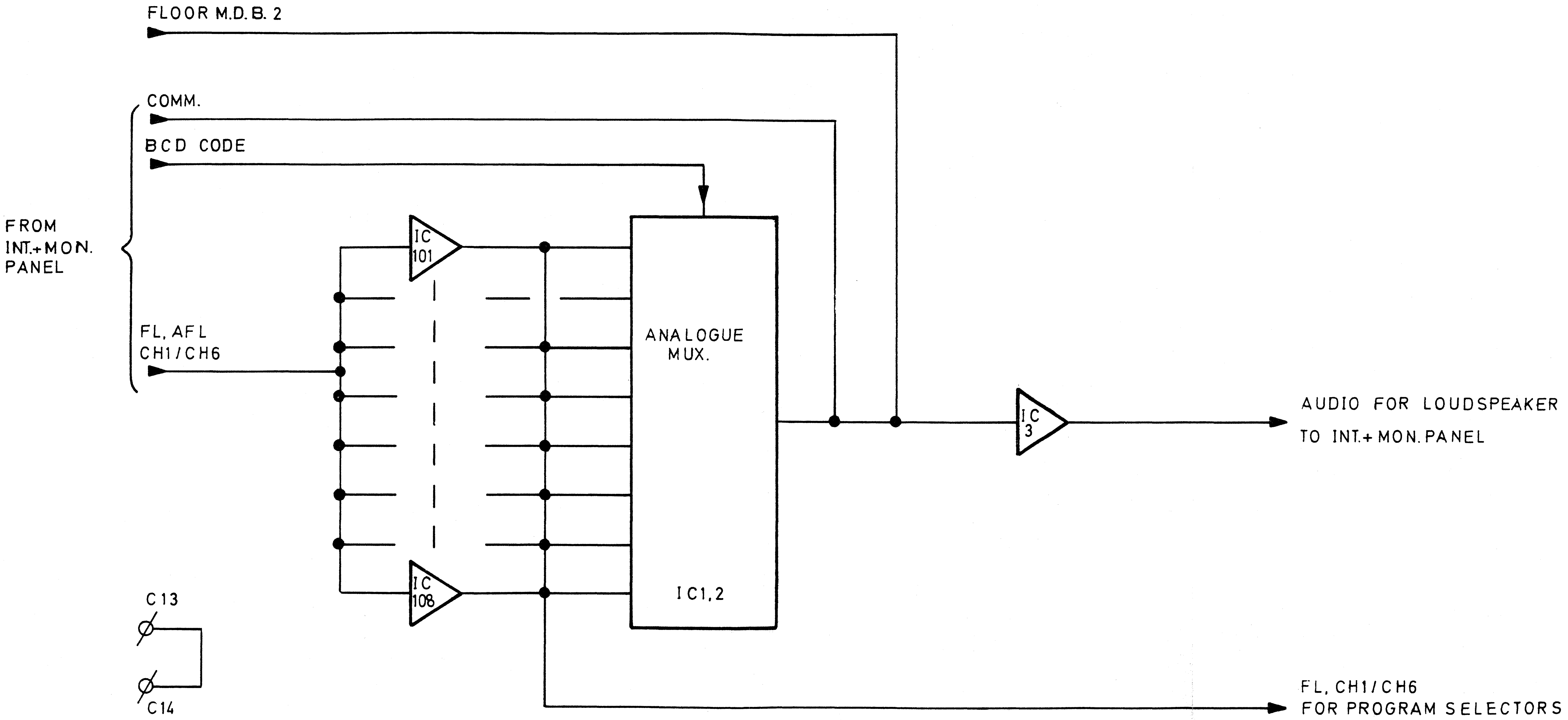

1X203
R231
R203
D201
C201
R205
TS201
T201B
R201
R202
R204A
R232
R233
IC201
R234
R235
R236
R237
IC202
C202+
C203+
C204+
C205+
C208+
C209+
C210+
C211+
C214+
C215+
C212+
C213+
C216+
C217+
N12
N6
N11
N5
N10
N4
N9
N3
N7
N1
N8
N2
R222
R223
R206
R207
R230
R221
R220
R229
R218
R219
R228
R217
R216
R227
R214
R215
R225
R211
R210
R226
R213
R212
R224
R208
R209
X201
32
1
C
A

SD9082T

PC BOARD
PRENTPANEEL 3922 151 90820

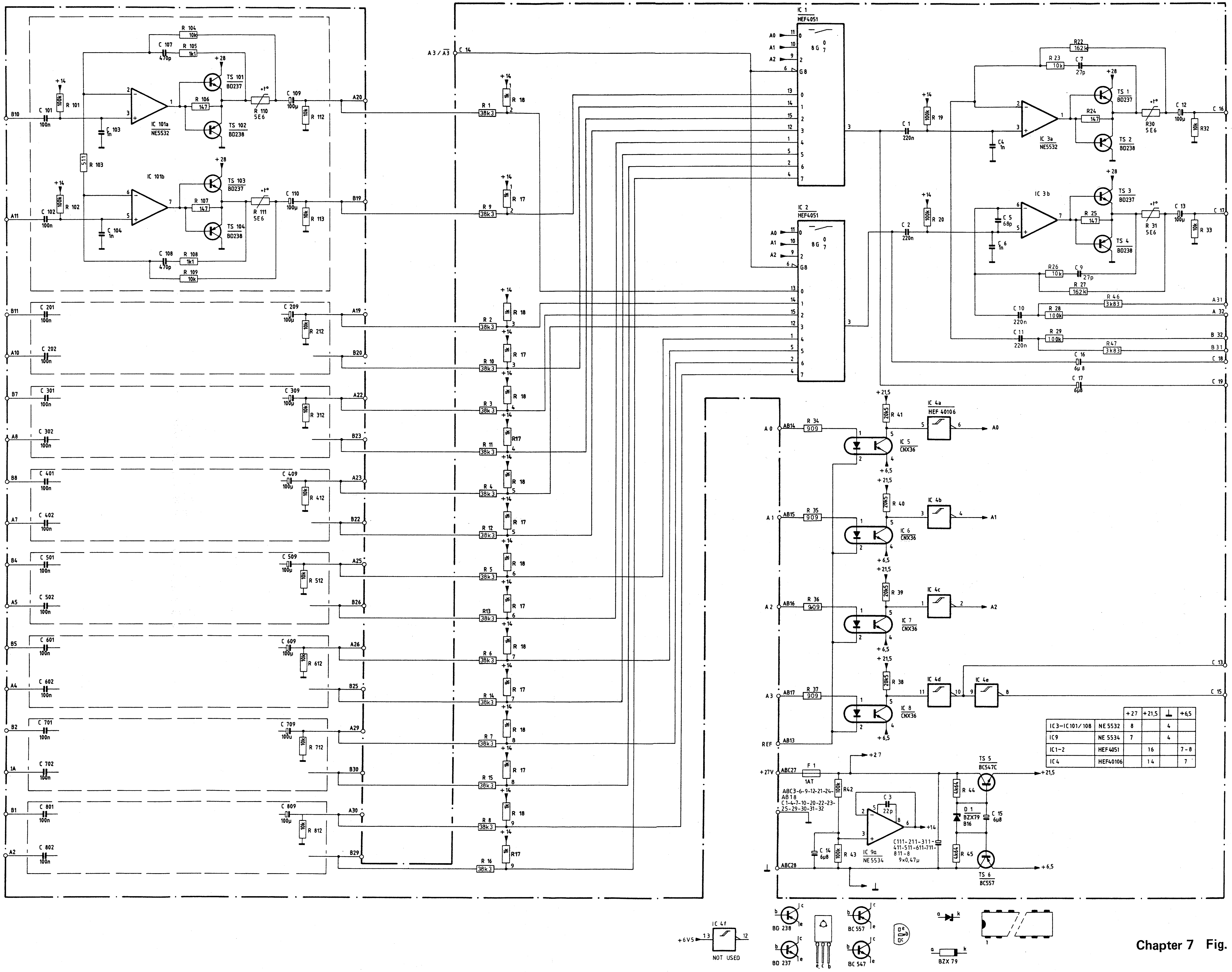
Chapter 6 Fig. 3

## BLOCK DIAGRAM MONITOR DISTRIBUTION BOARD


FLOOR M.D.B. 2
COMM.
BCD CODE
FROM
INT.+MON.
PANEL
FL, AFL
CH1/CH6
IC
101
IC
108
ANALOGUE
MUX.
IC1,2
IC
3
AUDIO FOR LOUDSPEAKER
TO INT.+MON. PANEL
FL, CH1/CH6
FOR PROGRAM SELECTORS
TO INT.+MON. PANEL
C13
C14

Chapter 7 Fig. 1

## CIRCUIT DIAGRAM MONITOR DISTRIBUTION BOARD

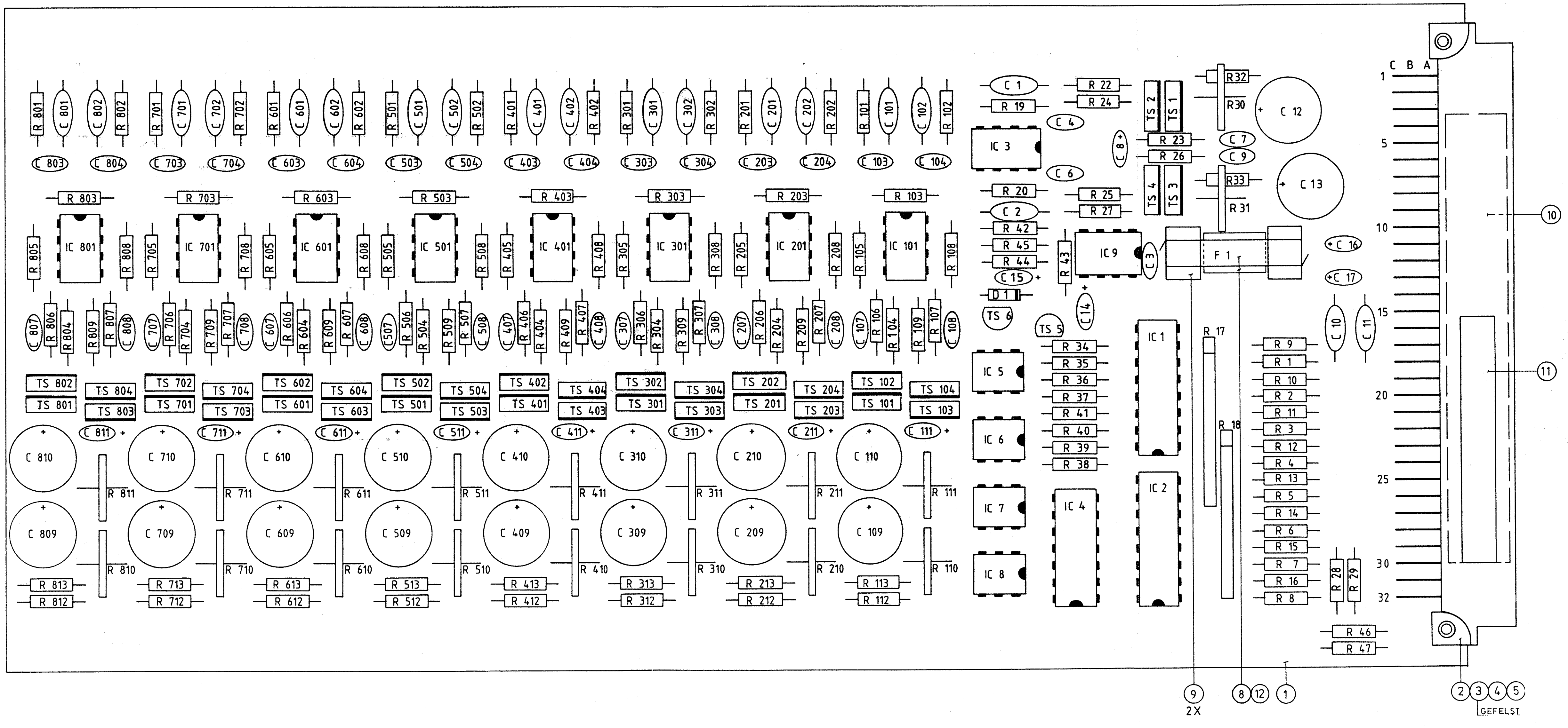


IC 101a NE5532
IC 101b
TS 101 BD237
TS 102 BD238
TS 103 BD237
TS 104 BD238
R 101
R 102
R 103
R 104 10k
R 105 1k1
R 106 147
R 107 147
R 108 1k1
R 109 10k
R 110 5E6
R 111 5E6
R 112
R 113
C 101 100n
C 102 100n
C 103 1n
C 104 1n
C 107 470p
C 108 470p
C 109 100µ
C 110 100µ
+14
+28
B10
A11
A20
B19
B11
A10
B7
A8
B8
A7
B4
A5
B5
A4
B2
1A
B1
A2
A19
B20
A22
B23
A23
B22
A25
B26
A26
B25
A29
B30
A30
B29
C 201
C 202
C 209
R 212
C 301
C 302
C 309
R 312
C 401
C 402
C 409
R 412
C 501
C 502
C 509
R 512
C 601
C 602
C 609
R 612
C 701
C 702
C 709
R 712
C 801
C 802
C 809
R 812
A3 / A3
C 14
R 1 38k3
R 2 38k3
R 3 38k3
R 4 38k3
R 5 38k3
R 6 38k3
R 7 38k3
R 8 38k3
R 9 38k3
R 10 38k3
R 11 38k3
R 12 38k3
R13 38k3
R 14 38k3
R 15 38k3
R 16 38k3
R 17
R 18
IC 1 HEF4051
IC 2 HEF4051
A0
A1
A2
8G
G8
C 1 220n
C 2 220n
R 19
R 20
C4 1n
C 5 68p
C 6 1n
IC 3a NE5532
IC 3b
R22 162k
R 23 10k
C 7 27p
TS 1 BD237
TS 2 BD238
TS 3 BD237
TS 4 BD238
R24 147
R 25 147
R30 5E6
R 31 5E6
C 12 100µ
C 13 100µ
R32
R 33
C 16
C 17
R26 10k
C 9 27p
R 27 162k
R 46 3k83
R 47 3k83
C 10 220n
C 11 220n
R 28 100k
R 29 100k
C 16 6µ8
C 17 6µ8
A 31
A 32
B 32
B 31
C 18
C 19
+21,5
+6,5
R 41 20k5
R 40 20k5
R 39 20k5
R 38 20k5
IC 4a HEF 40106
IC 4b
IC 4c
IC 4d
IC 4e
IC 5 CNX36
IC 6 CNX36
IC 7 CNX36
IC 8 CNX36
AB14
AB15
AB16
AB17
AB13
REF
R 34 909
R 35 909
R 36 909
R 37 909
C 13
C 15
A3
A3
+27V
ABC27
F 1 1AT
+27
R42 100k
R 43 100k
C 3 22p
IC 9a NE5534
+14
C 14 6µ8
ABC3-6-9-12-21-24-
AB18
C1-4-7-10-20-22-23-
25-29-30-31-32
C111-211-311-411-511-611-711-811-8 9x0,47µ
ABC28
R 44 4k64
R 45 4k64
D 1 BZX79 B16
C 15 6µ8
TS 5 BC547C
TS 6 BC557
IC 4f
+6V5
NOT USED
BD 238
BD 237
BC 557
BC 547
BZX 79
e c b

|  |  | +27 | +21,5 | ⊥ | +6,5 |
|---|---|---|---|---|---|
| IC3–IC101/108 | NE5532 | 8 |  | 4 |  |
| IC9 | NE 5534 | 7 |  | 4 |  |
| IC1–2 | HEF4051 |  | 16 |  | 7 – 8 |
| IC4 | HEF40106 |  | 14 |  | 7 |

Chapter 7 Fig. 2

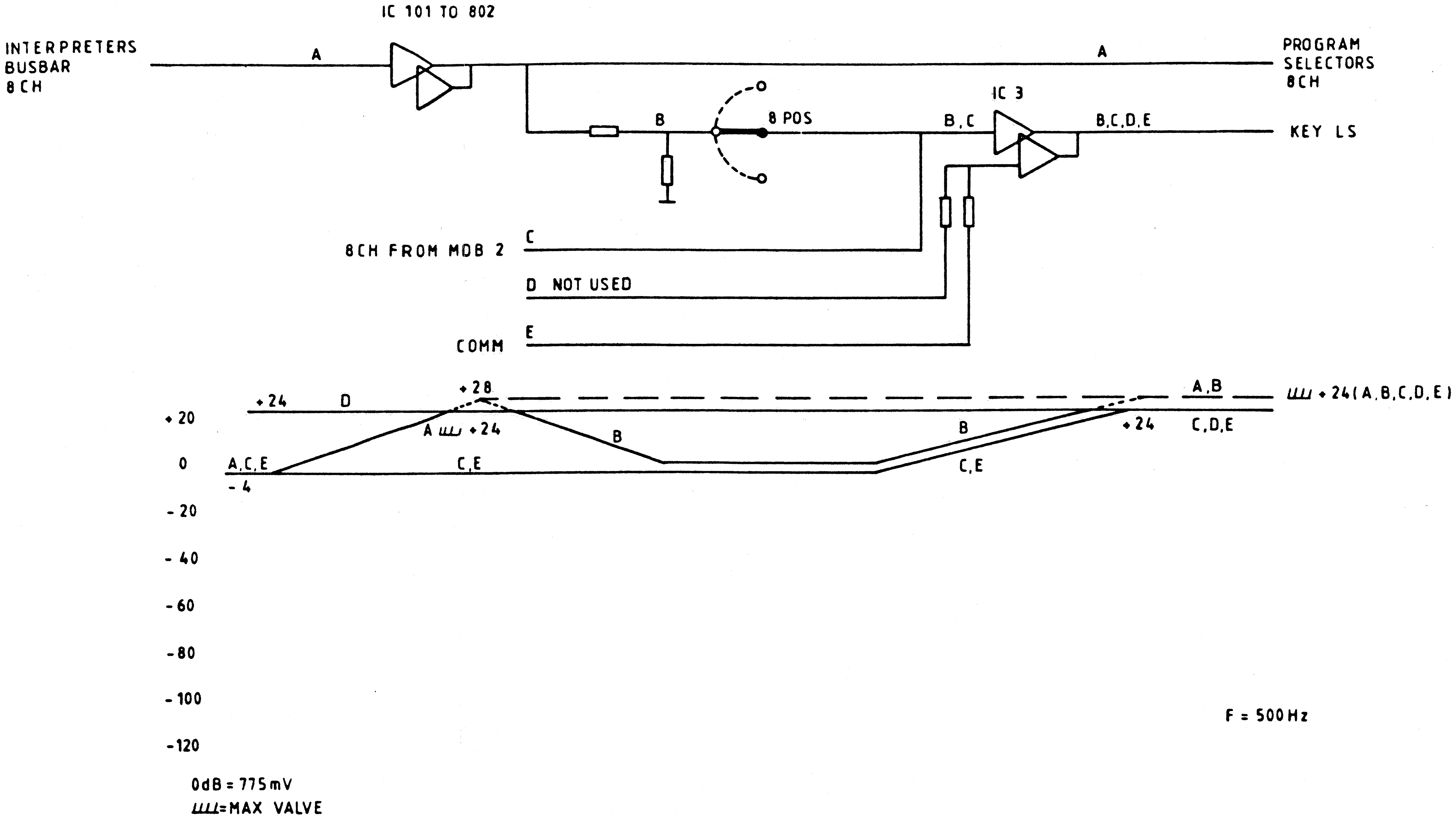
## COMPONENT LOCATION MONITOR DISTRIBUTION BOARD


C B A
1
5
10
15
20
25
30
32
⑩
⑪
⑨
2X
⑧⑫ ①
②③④⑤
GEFELST.
IC 1
IC 2
IC 3
IC 4
IC 5
IC 6
IC 7
IC 8
IC 9
IC 101
IC 201
IC 301
IC 401
IC 501
IC 601
IC 701
IC 801
F 1
D 1
TS 1
TS 2
TS 3
TS 4
TS 5
TS 6
C 12
C 13
R 17
R 18
R30
R 31
R32
R33

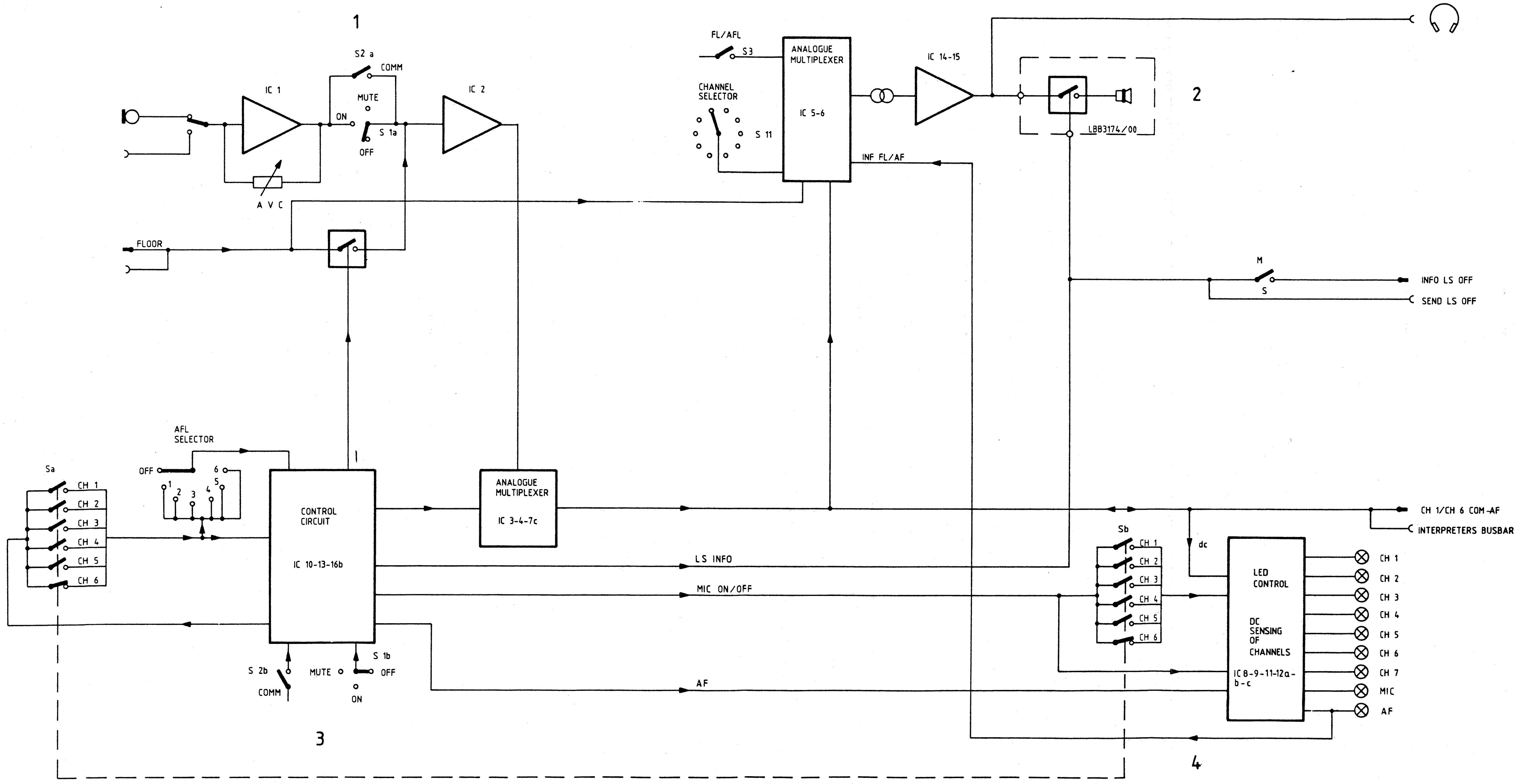
MAX. BOUWHOOGTE 14MM

Chapter 7 Fig. 3

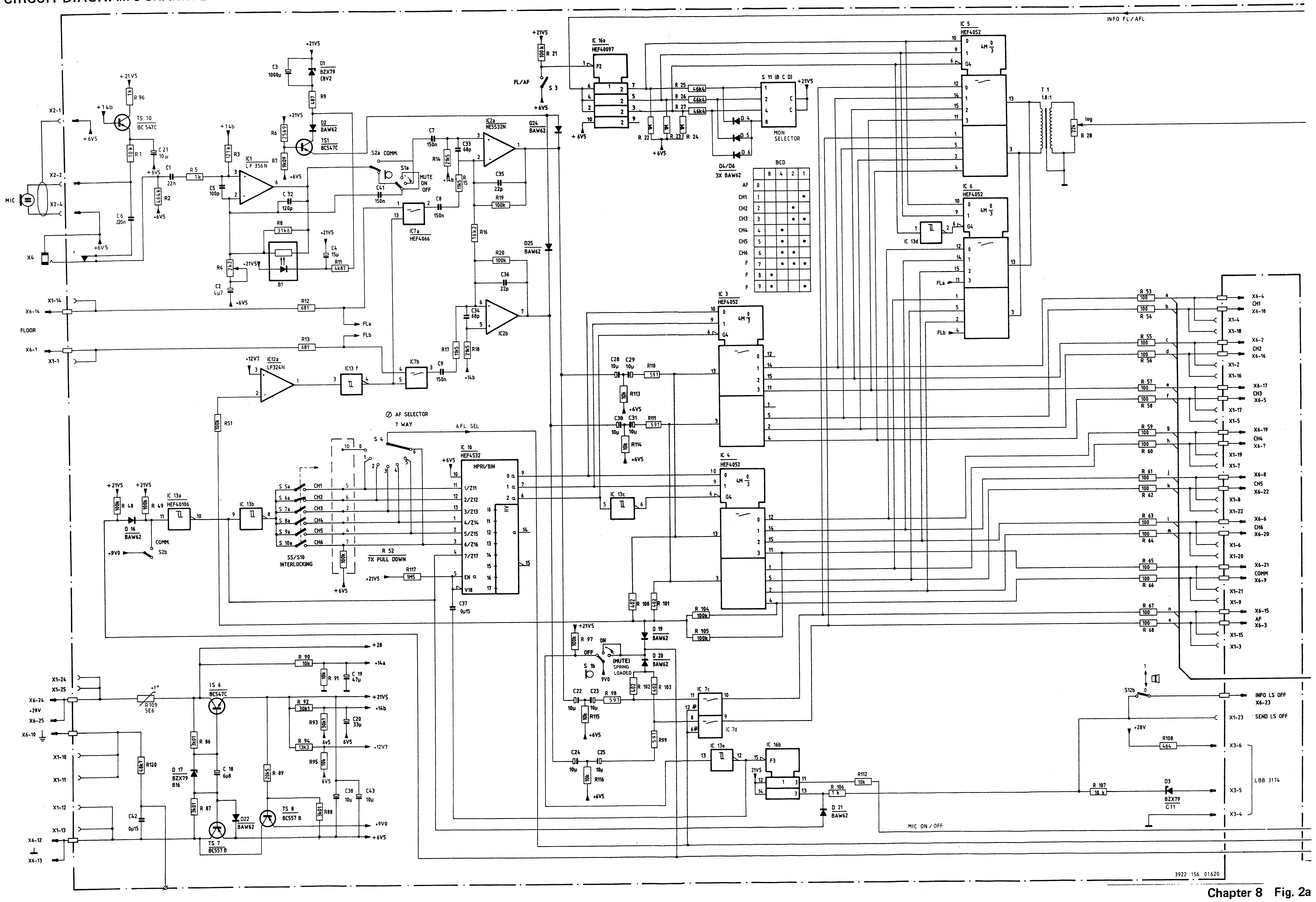
# LEVEL DIAGRAM MDB LBB 3203/00


IC 101 TO 802
INTERPRETERS BUSBAR 8CH
A
A
PROGRAM SELECTORS 8CH
B
8 POS
IC 3
B,C
B,C,D,E
KEY LS
8CH FROM MDB 2
C
D NOT USED
COMM
E
+28
+24
D
A,B
ധധ +24(A,B,C,D,E)
+20
A ധധ +24
B
B
+24
C,D,E
0
A,C,E
C,E
C,E
-4
-20
-40
-60
-80
-100
-120
F = 500Hz
0dB = 775mV
ധധ=MAX VALVE

## BLOCK DIAGRAM 6 CHANNEL INTERPRETER'S DESK


1
S2 a
COMM
MUTE
ON
S 1a
OFF
IC 1
IC 2
A V C
FLOOR
FL/AFL
S3
CHANNEL SELECTOR
S 11
ANALOGUE MULTIPLEXER
IC 5-6
INF FL/AF
IC 14-15
LBB3174/00
2
M
S
INFO LS OFF
SEND LS OFF
AFL SELECTOR
OFF
1
2
3
4
5
6
Sa
CH 1
CH 2
CH 3
CH 4
CH 5
CH 6
CONTROL CIRCUIT
IC 10-13-16b
ANALOGUE MULTIPLEXER
IC 3-4-7c
LS INFO
MIC ON/OFF
AF
S 2b
COMM
MUTE
S 1b
OFF
ON
3
CH 1/CH 6 COM-AF
INTERPRETERS BUSBAR
Sb
CH 1
CH 2
CH 3
CH 4
CH 5
CH 6
dc
LED CONTROL
DC SENSING OF CHANNELS
IC 8-9-11-12a-b-c
CH 1
CH 2
CH 3
CH 4
CH 5
CH 6
CH 7
MIC
AF
4

# CIRCUIT DIAGRAM 6 CHANNEL INTERPRETER'S DESK

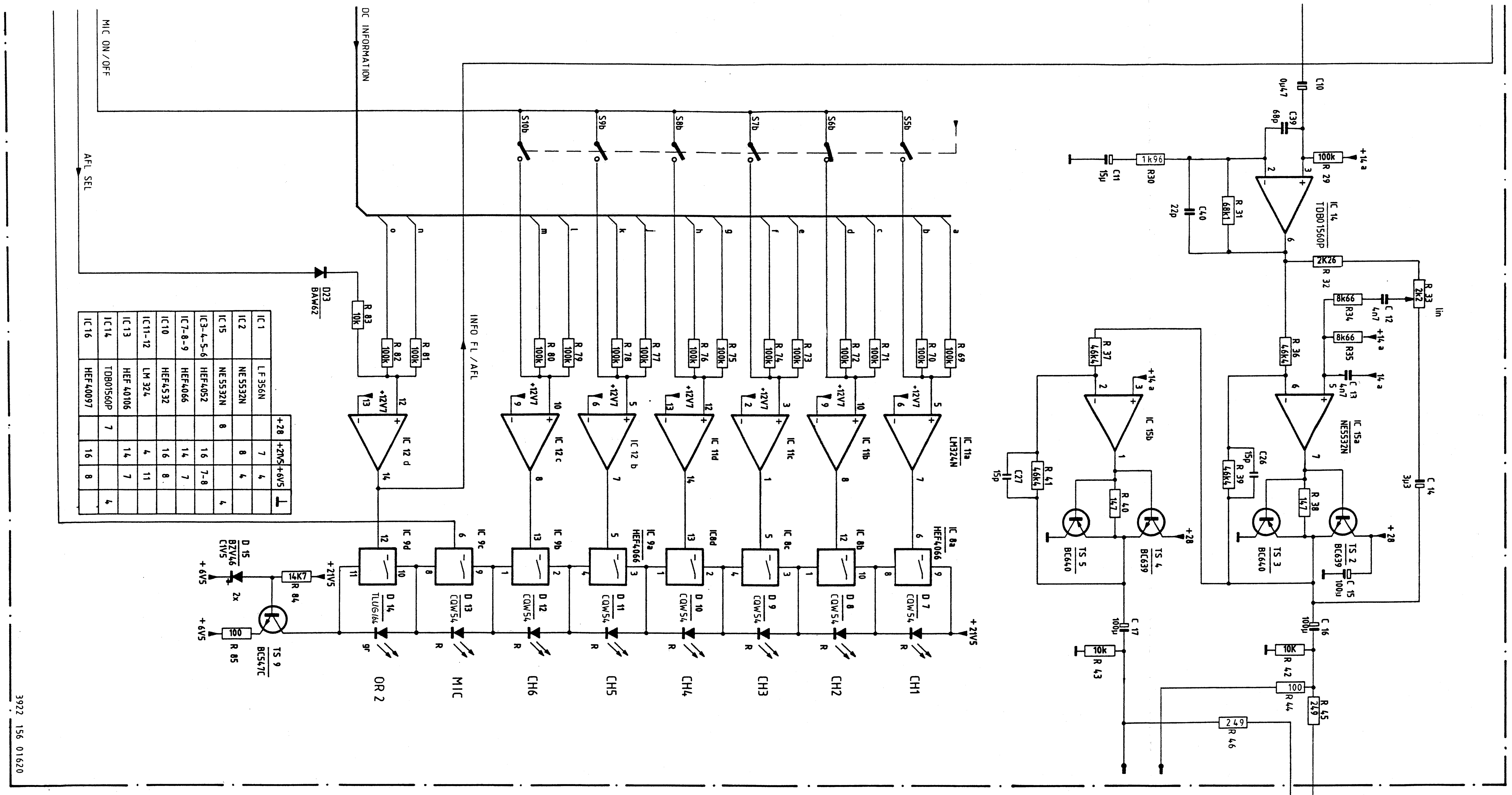


|  | BCD 8 | 4 | 2 | 1 |
|---|---|---|---|---|
| AF 0 |  |  |  |  |
| CH1 1 |  |  |  | • |
| CH2 2 |  |  | • |  |
| CH3 3 |  |  | • | • |
| CH4 4 |  | • |  |  |
| CH5 5 |  | • |  | • |
| CH6 6 |  | • | • |  |
| F 7 |  | • | • | • |
| F 8 | • |  |  |  |
| F 9 | • |  |  | • |

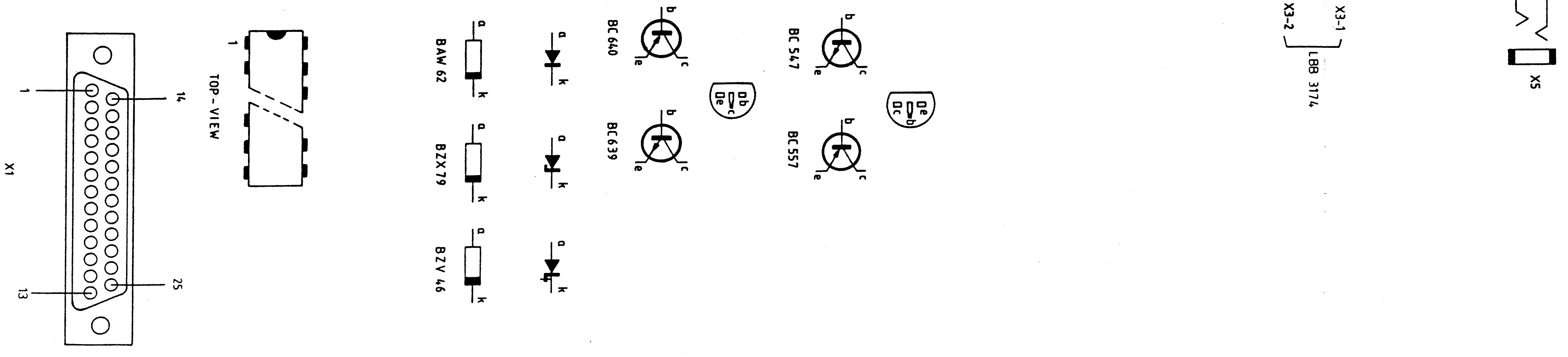
MIC
X2-1
X2-2
X2-4
X4
+21V5
R 96
+14b
TS 10
BC547C
+6V5
R1
C 21
10μ
C1
22n
R 5
1k
R2
C 6
220n
+14b
R3
C5
100p
IC1
LF 356N
C 32
120p
R8
31k6
R4
2k2
C2
4μ7
B1
C4
15μ
R11
4k87
+21V5
C3
1000μ
D1
BZX79
C8V2
R9
R6
R7
D2
BAW62
TS1
BC547C
S2a COMM.
S1a
MUTE
ON
OFF
C41
150n
C7
150n
R14
C33
68p
IC2a
NE5532N
C35
22p
R19
100k
C8
150n
IC7a
HEF4066
R16
16k2
R20
100k
C36
22p
C34
68p
IC2b
R17
R18
C9
150n
IC7b
IC13 f
IC12a
LF324N
+12V7
R51
100k
R12
681
R13
681
FLa
FLb
X1-14
X6-14
FLOOR
X6-1
X1-1
AF SELECTOR
7 WAY
AFL SEL
S 4
IC 10
HEF4532
HPRI/BIN
S 5a
S 6a
S 7a
S 8a
S 9a
S 10a
CH1
CH2
CH3
CH4
CH5
CH6
S5/S10
INTERLOCKING
R 52
7X PULL DOWN
R117
1M5
C37
0μ15
IC 13a
HEF40106
IC 13b
R 48
R 49
D 16
BAW62
COMM.
S2b
+9V0
+21V5
R 21
100k
FL/AF
S 3
IC 16a
HEF40097
F2
D24
BAW62
D25
BAW62
S 11 (B C D)
R 25
R 26
R 27
46k4
R 22
R 23
R 24
D 4
D 5
D 6
MON
SELECTOR
D4/D6
3X BAW62
IC 5
HEF4052
4M 0/3
G4
T 1
1.8:1
log
R 28
22k
INFO FL/AFL
IC 6
HEF4052
IC 13d
FLa
FLb
IC 3
HEF4052
C28
10μ
C29
10μ
R110
591
R113
10k
C30
C31
R111
591
R114
10k
IC 4
HEF4052
IC 13c
R 100
402
R 101
R 104
100k
R 105
100k
D 19
BAW62
D 20
BAW62
R 97
100k
ON
OFF
(MUTE)
SPRING
LOADED
S 1b
9V0
C22
C23
R 98
591
R115
R 102
R 103
R99
C24
C25
R116
IC 7c
IC 7d
IC 13e
IC 16b
F3
R112
10k
R 106
1 k
D 21
BAW62
R 107
10 k
D3
BZX79
C11
R108
464
+28V
S12b
MIC ON / OFF
INFO LS OFF
X6-23
X1-23
SEND LS OFF
X3-6
X3-5
X3-4
LBB 3174
R 53
R 54
R 55
R 56
R 57
R 58
R 59
R 60
R 61
R 62
R 63
R 64
R 65
R 66
R 67
R 68
100
X6-4
CH1
X6-18
X1-4
X1-18
X6-2
CH2
X6-16
X1-2
X1-16
X6-17
CH3
X6-5
X1-17
X1-5
X6-19
CH4
X6-7
X1-19
X1-7
X6-8
CH5
X6-22
X1-8
X1-22
X6-6
CH6
X6-20
X1-6
X1-20
X6-21
COMM
X6-9
X1-21
X1-9
X6-15
AF
X6-3
X1-15
X1-3
X1-24
X1-25
X6-24
+28V
X6-25
X6-10
X1-10
X1-11
X1-12
X1-13
X6-12
X6-13
R 109
SE6
R120
48k7
C42
0μ15
TS 6
BC547C
R 86
3k01
D 17
BZX79
B16
C 18
6μ8
R 87
3k01
TS 7
BC557B
R 89
20k5
D22
BAW62
TS 8
BC557 B
R88
3k01
R 90
10k
R 91
10k
C 19
47μ
R 92
30k1
R93
30k1
C20
33μ
R 94
13k3
R95
10k
C38
10μ
C43
10μ
+28
+14a
+21V5
+14b
+12V7
+9V0
+6V5
3922 156 01620

Chapter 8 Fig. 2a

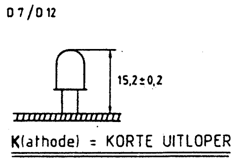
## CIRCUIT DIAGRAM 6 CHANNEL INTERPRETER'S DESK

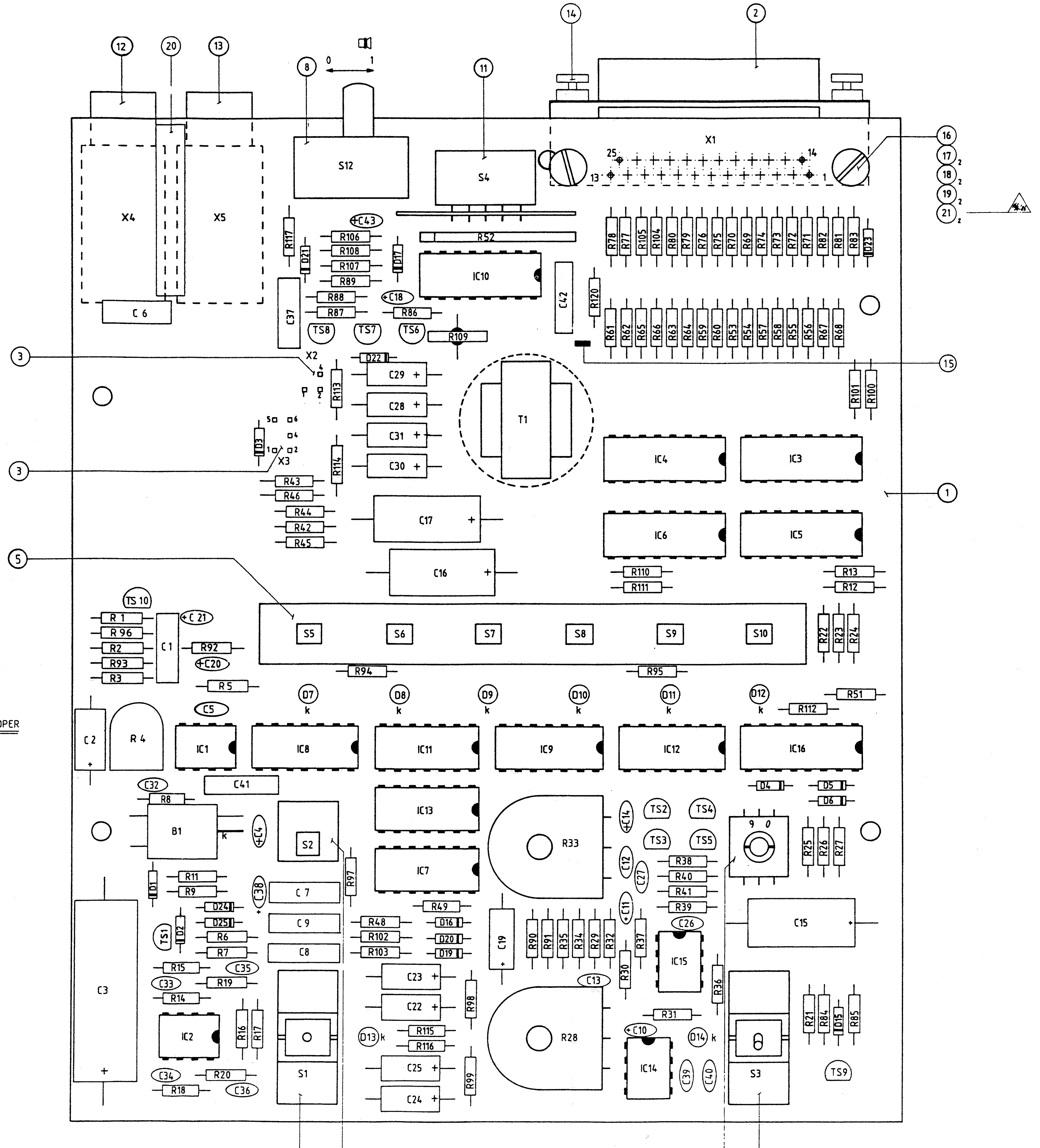

MIC ON/OFF
DC INFORMATION
AFL SEL
INFO FL /AFL
S10b
S9b
S8b
S7b
S6b
S5b
D23 BAW62
R 83 10k
R 82 100k
R 81 100k
R 80 100k
R 79 100k
R 78 100k
R 77 100k
R 76 100k
R 75 100k
R 74 100k
R 73 100k
R 72 100k
R 71 100k
R 70 100k
R 69 100k
+12V7
IC 12 d
IC 12 c
IC 12 b
IC 11d
IC 11c
IC 11b
IC 11a LM324N
IC 9d
IC 9c
IC 9b
IC 9a HEF4066
IC8d
IC 8c
IC 8b
IC 8a HEF4066
D 15 BZV46 C1V5
+6V5
14K7
R 84
+21V5
TS 9 BC547C
100
R 85
D 14 TLUG164
D 13 CQW54
D 12 CQW54
D 11 CQW54
D 10 CQW54
D 9 CQW54
D 8 CQW54
D 7 CQW54
OR 2
MIC
CH6
CH5
CH4
CH3
CH2
CH1
C10 0µ47
C39 68p
100k
R 29
+14 a
C11 15µ
1k96
R30
C40 22p
R 31 68k1
IC 14 TDB0156OP
2K26
R 32
R 33 2k2
lin
8k66
R34
C 12 4n7
8k66
R35
C 13 4n7
R 37 46k4
IC 15b
R 41 46k4
C27 15p
R 40 147
TS 5 BC640
TS 4 BC639
+28
R 36 46k4
IC 15a NE5532N
C26 15p
R 39 46k4
R 38 147
TS 3 BC640
TS 2 BC639
C 15 100µ
C 14 3µ3
C 17 100µ
C 16 100µ
10k
R 43
10K
R 42
100
R 44
R 45 249
249
R 46
3922 156 01620
X3-1
X3-2
LBB 3174
X5

| | | +28 | +21V5 | +6V5 | ⊥ |
|---|---|---|---|---|---|
| IC 1 | LF356N | | 7 | 4 | |
| IC 2 | NE5532N | | 8 | 4 | |
| IC 15 | NE5532N | 8 | | | 4 |
| IC3-4-5-6 | HEF4052 | | 16 | 7-8 | |
| IC7-8-9 | HEF4066 | | 14 | 7 | |
| IC10 | HEF4532 | | 16 | 8 | |
| IC11-12 | LM 324 | | 4 | 11 | |
| IC 13 | HEF 40106 | | 14 | 7 | |
| IC14 | TDB0156OP | 7 | | | 4 |
| IC 16 | HEF40097 | | 16 | 8 | |


1
14
13
25
X1
TOP-VIEW
BAW 62
BZX79
BZV 46
a
k
BC640
BC639
BC 547
BC 557
b
c
e

# LOCATIONS OF COMPONENTS 6 CHANNEL INTERPRETER'S DESK

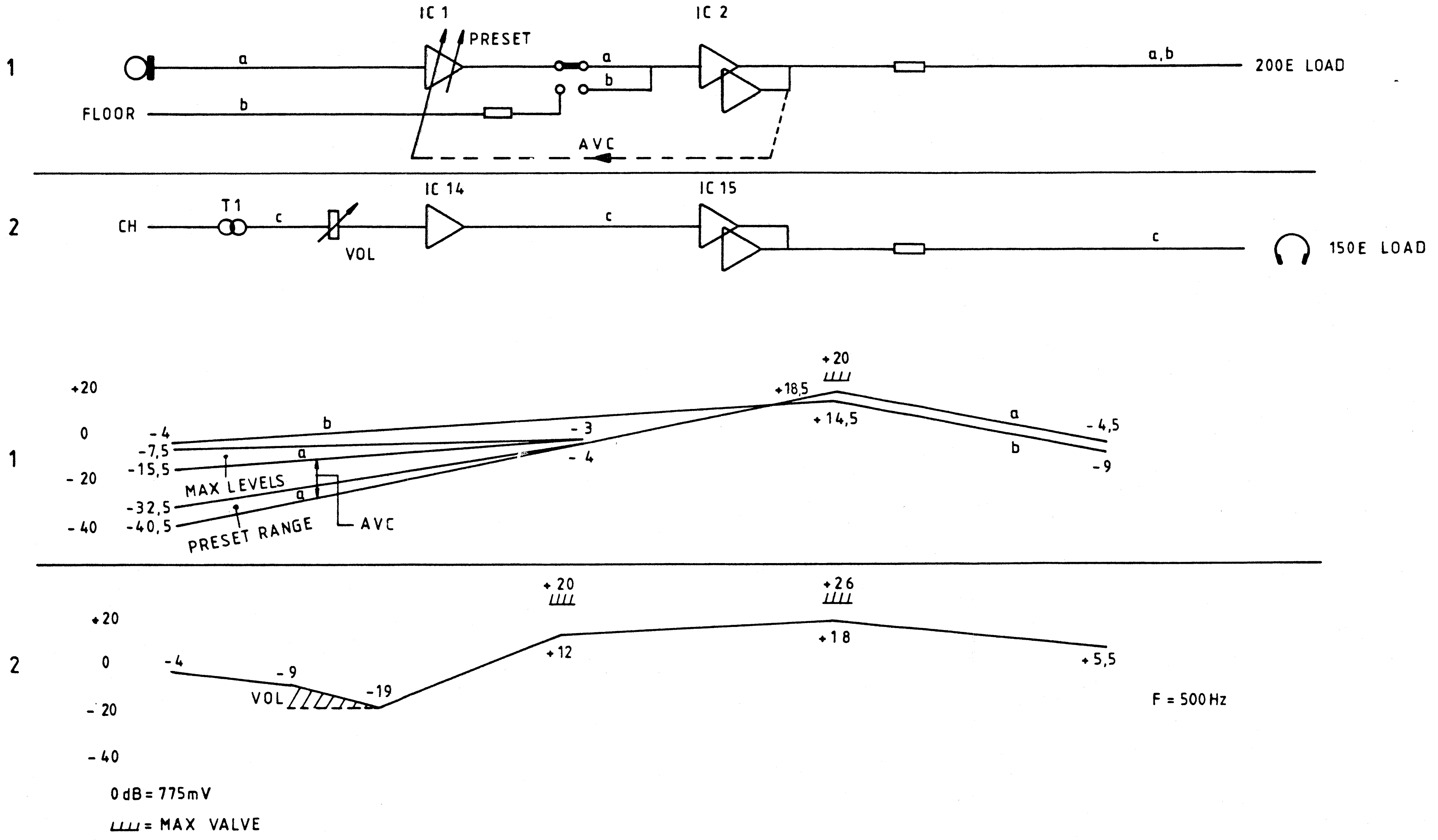

D7/D12
15,2±0,2
K(athode) = KORTE UITLOPER

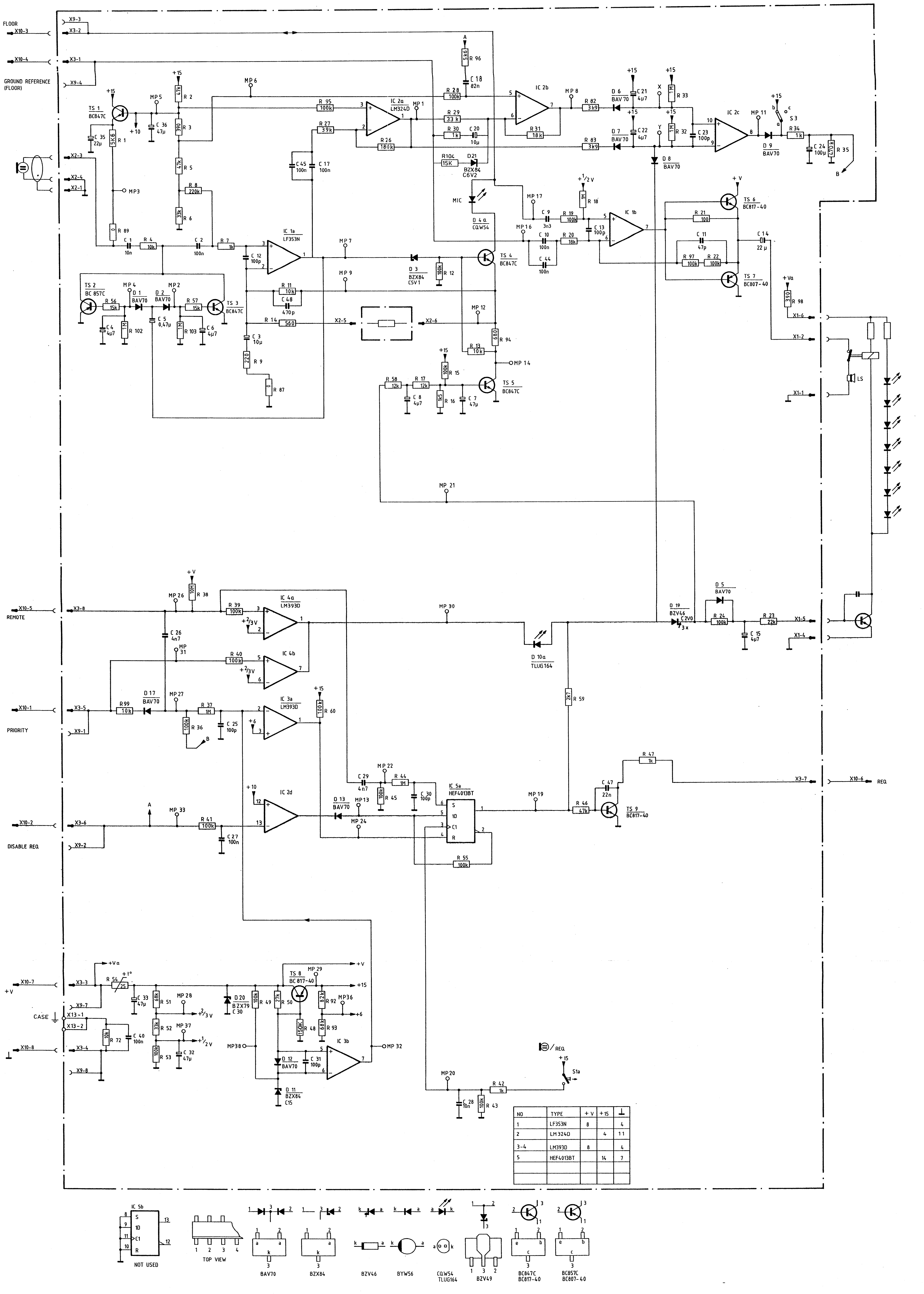

12
20
13
8
0
1
11
14
2
X4
X5
C 6
S12
S4
X1
25
14
13
1
16
17
18
19
21
R117
D21
C43
R106
R108
R107
R89
R88
R87
D17
C18
R86
R52
IC10
C42
R120
R78
R77
R105
R104
R80
R79
R76
R75
R70
R69
R74
R73
R72
R71
R82
R81
R83
D23
R61
R62
R65
R66
R63
R64
R59
R60
R53
R54
R57
R58
R55
R56
R67
R68
C37
TS8
TS7
TS6
R109
15
3
X2
D22
R113
C29
C28
C31
C30
T1
R101
R100
D3
X3
R114
IC4
IC3
1
R43
R46
R44
R42
R45
C17
IC6
IC5
5
C16
R110
R111
R13
R12
TS 10
R 1
R 96
R2
R93
R3
C 1
C 21
R92
C20
R5
S5
S6
S7
S8
S9
S10
R94
R95
R22
R23
R24
D7
D8
D9
D10
D11
D12
k
R51
R112
C5
C 2
R 4
IC1
IC8
IC11
IC9
IC12
IC16
C41
C32
R8
B1
k
C4
D4
D5
D6
IC13
S2
R97
R33
C14
TS2
TS4
TS3
TS5
9 0
R25
R26
R27
R11
R9
D1
C38
C 7
IC7
C12
C27
R38
R40
R41
R39
C11
C15
D24
D25
R6
R7
TS1
D2
C 9
C8
R48
R102
R103
R49
D16
D20
D19
C19
R90
R91
R35
R34
R29
R32
R37
C26
IC15
R30
R36
C3
R15
C35
C33
R19
R14
C23
C22
R98
C13
R31
IC2
R16
R17
D13
k
R115
R116
R28
C10
D14
k
R21
R84
D15
R85
S1
C25
IC14
C39
C40
S3
TS9
C34
R20
R18
C36
C24
R99
7
9
10
6

P.C. BOARD
PRENTPANEEL
3922 151 90570

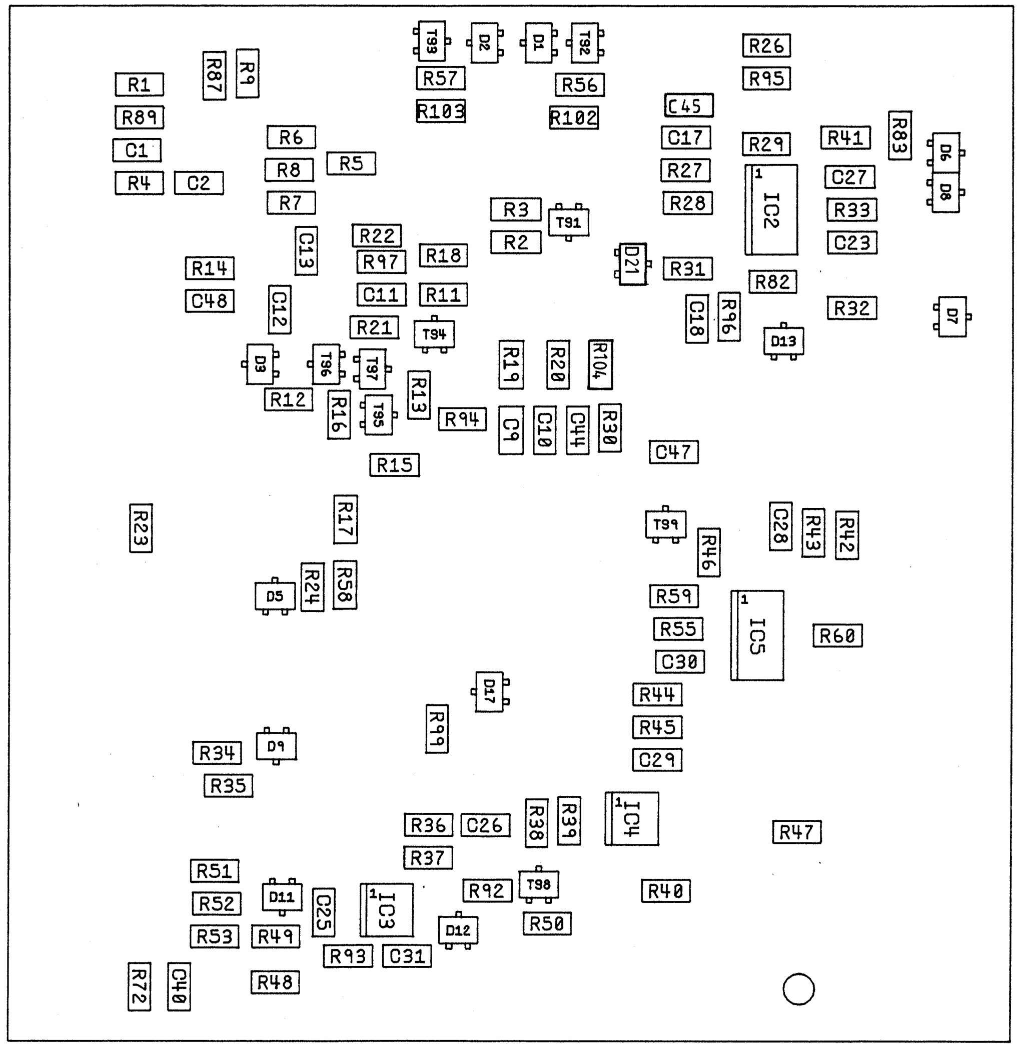
Chapter 8 Fig. 3

**LEVEL DIAGRAM INTERPRETER'S DESK LBB 3221/00**

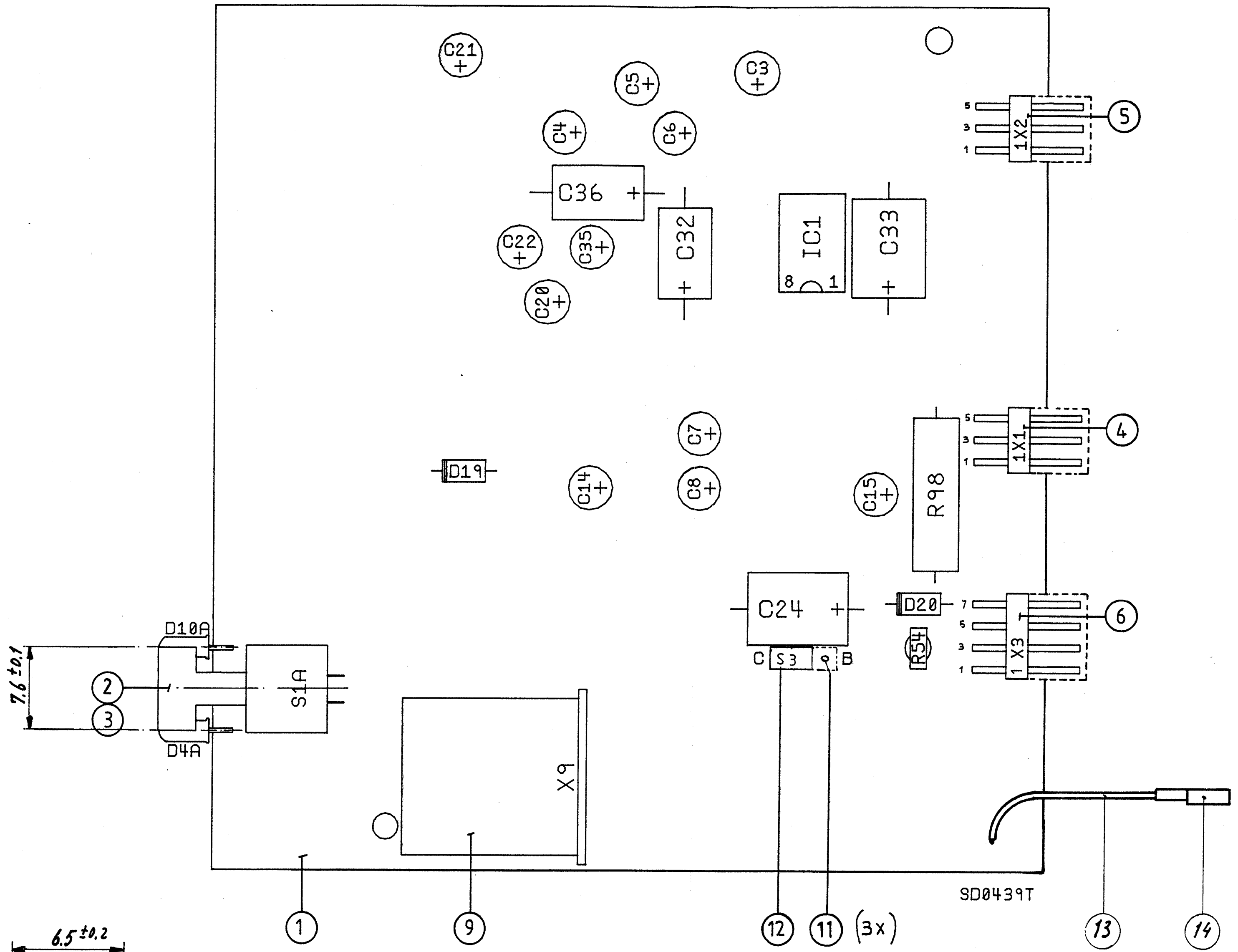

1
IC 1
PRESET
IC 2
a
a
b
a,b
200E LOAD
FLOOR
b
AVC
2
IC 14
IC 15
CH
T1
c
VOL
c
c
150E LOAD
+20
0
- 20
- 40
1
-4
-7,5
-15,5
-32,5
-40,5
b
a
a
MAX LEVELS
PRESET RANGE
AVC
-3
-4
+18,5
+20
+14,5
a
b
-4,5
-9
2
+20
0
- 20
- 40
-4
-9
VOL
-19
+20
+12
+26
+18
+5,5
F = 500 Hz
0 dB = 775mV
= MAX VALVE


FLOOR
X10-3
X9-3
X3-2
X10-4
X3-1
GROUND REFERENCE (FLOOR)
X9-4
X2-3
X2-4
X2-1
TS 1 BC847C
C 35 22µ
R 1 5k6
MP5
C 36 47µ
+10
R 2 47k
R 3 390
R 5 47k
R 6 33k
R 8 220k
MP 6
MP3
R 89 0
C 1 10n
R 4 10k
C 2 100n
R 7 1k
TS 2 BC 857C
MP 4
D 1 BAV70
D 2 BAV70
MP 2
R 56 15k
R 57 15k
TS 3 BC847C
C 4 4µ7
R 102 1M
C 5 0,47µ
R 103 1M
C 6 4µ7
R 95 100k
IC 2a LM324D
MP 1
R 27 39k
R 26 180k
C 45 100n
C 17 100n
IC 1a LF353N
C 12 100p
MP 7
MP 9
R 11 10k
C 48 470p
R 14 560
X2-5
X2-6
C 3 10µ
R 9 220
R 87 0
A
R 96 5k6
C 18 82n
R 28 100k
R 29 33 k
R 30 1k
C 20 10µ
R104 15K
D21 BZX84 C6V2
IC 2b
R 31 18k
MP 8
R 82 3k9
R 83 3k9
D 6 BAV70
D 7 BAV70
C 21 4µ7
C 22 4µ7
X
Y
R 33 1M
R 32 1M
C 23 100p
IC 2c
MP 11
S 3
D 9 BAV70
R 34 1k
C 24 100µ
R 35 470k
B
D 8 BAV70
MIC
D 4 a CQW54
+1/2 V
R 18 1M
MP 17
C 9 3n3
R 19 100k
MP 16
C 10 100n
C 44 100n
R 20 18k
C 13 100p
IC 1b
D 3 BZX84 C5V1
R 12 100k
TS 4 BC847C
MP 12
R 94 680
R 13 10k
MP 14
+15
R 15 100k
R 58 12k
R 17 12k
R 16 1k5
C 8 4µ7
C 7 47µ
TS 5 BC847C
MP 21
+V
TS 6 BC817-40
R 21 100
C 11 47p
R 97 100k
R 22 100k
TS 7 BC807-40
C 14 22 µ
+Va
R 98 390
X1-6
X1-2
X1-1
LS
X10-5
REMOTE
X3-8
MP 26
R 38 10M
R 39 100k
IC 4a LM393D
+2/3V
MP 30
C 26 4n7
MP 31
R 40 100k
IC 4b
D 10a TLUG164
D 19 BZV46 C2V0
3x
D 5 BAV70
R 24 100k
R 23 22k
C 15 4µ7
X1-5
X1-4
X10-1
X3-5
PRIORITY
X9-1
R99 10k
D 17 BAV70
MP 27
R 37 1M
R 36 100k
C 25 100p
IC 3a LM393D
+6
R 60 100k
R 59 2k7
X10-2
X3-6
DISABLE REQ
X9-2
MP 33
R 41 100k
C 27 100n
+10
IC 2d
D 13 BAV70
MP13
MP 24
C 29 4n7
MP 22
R 44 1M
R 45 100k
C 30 100p
IC 5a HEF4013BT
S
1D
C1
R
R 55 100k
MP 19
R 46 47k
C 47 22n
TS 9 BC817-40
R 47 1k
X3-7
X10-6
REQ
X10-7
+V
X3-3
R 54 25
+t°
X9-7
CASE
X13-1
X13-2
R 72 10k
C 40 100n
X10-8
X3-4
X9-8
C 33 47µ
R 51 68k
R 52 33k
R 53 100k
MP 28
MP 37
C 32 47µ
+1/2 V
D 20 BZX79 C 30
MP38
R 49 100k
R 50 27k
TS 8 BC 817-40
MP 29
R 48 150K
R 92 82k
R 93 68k
MP36
D 12 BAV70
C 31 100p
IC 3b
MP 32
D 11 BZX84 C15
MP 20
C 28 10n
R 42 1k
R 43 100k
S1a
/REQ
IC 5b
NOT USED
TOP VIEW
BAV70
BZX84
BZV46
BYW56
CQW54 TLUG164
BZV49
BC847C BC817-40
BC857C BC807-40

| NO | TYPE | + V | +15 | ⊥ |
|---|---|---|---|---|
| 1 | LF353N | 8 |  | 4 |
| 2 | LM324D |  | 4 | 11 |
| 3-4 | LM393D | 8 |  | 4 |
| 5 | HEF4013BT |  | 14 | 7 |
|  |  |  |  |  |
|  |  |  |  |  |

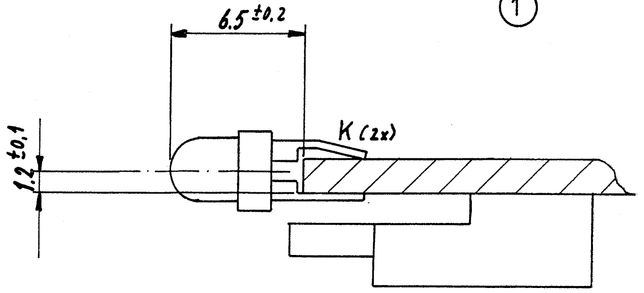

R1
R89
C1
R4
C2
R87
R9
R6
R8
R7
R5
C13
C12
R14
C48
D3
T96
T97
T95
R12
R16
R13
R22
R97
R18
C11
R11
R21
T94
T93
D2
D1
T92
R57
R103
R56
R102
R3
R2
T91
D21
R19
R20
R104
R94
C9
C10
C44
R30
R15
C45
C17
R27
R28
R31
C18
R96
R26
R95
R29
IC2
1
R82
D13
R41
R83
C27
R33
C23
R32
D6
D8
D7
C47
R23
R17
D5
R24
R58
T99
R46
C28
R43
R42
R59
R55
C30
IC5
1
R60
D17
R99
R44
R45
C29
R34
D9
R35
R36
C26
R37
R38
R39
IC4
1
R47
R51
R52
R53
D11
R49
C25
IC3
R93
C31
D12
R92
T98
R50
R40
R48
R72
C40

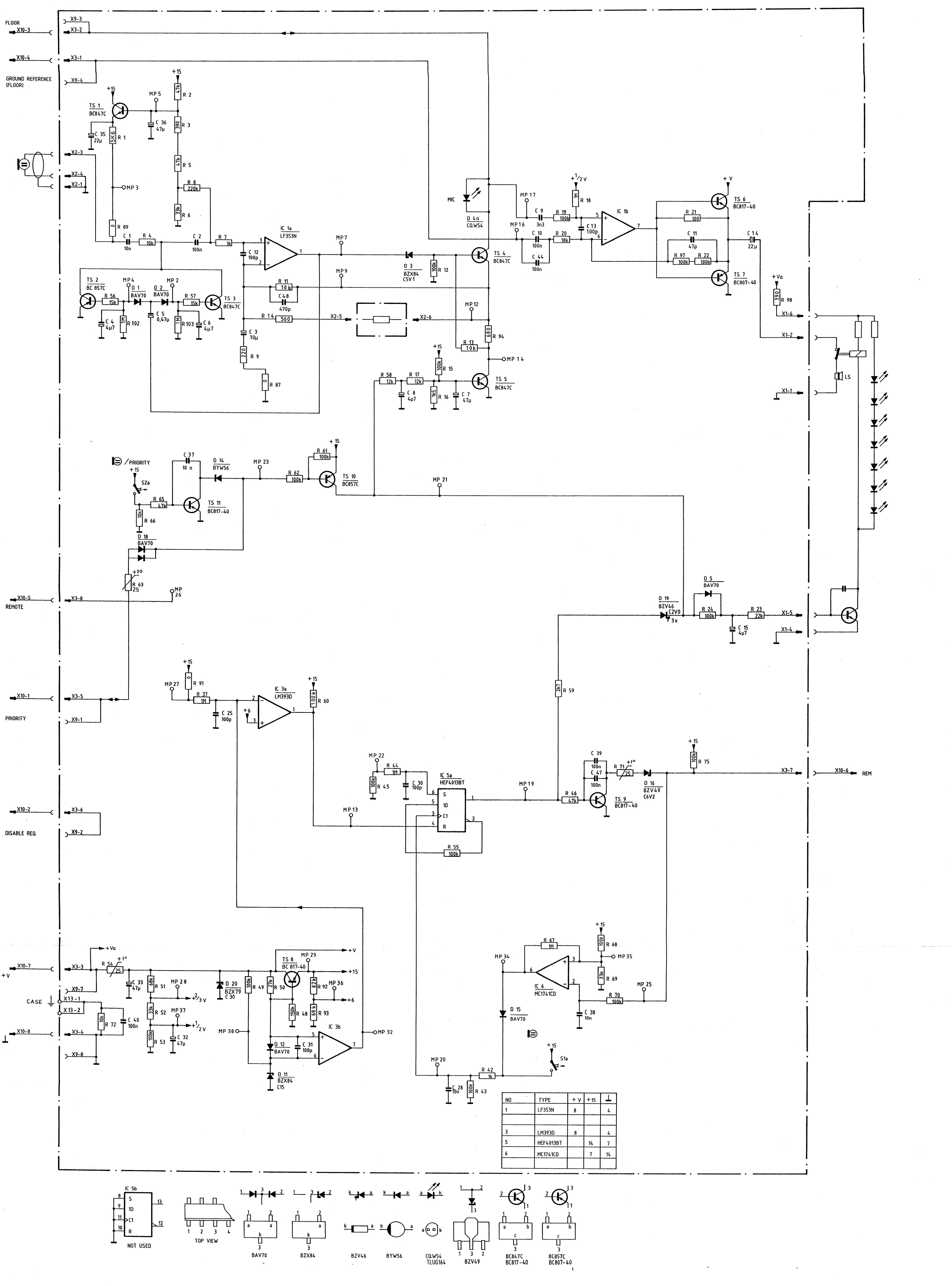
SD0439B


C21
C5
C3
C4
C6
C36
C32
IC1
8
1
C33
C22
C35
C20
5
3
1
1X2
⑤
C7
C8
C14
C15
D19
R98
5
3
1
1X1
④
C24
D20
R54
7
5
3
1
1 X3
⑥
10,4 ±0,1
D10A
D4A
②
③
S1A
C
S3
B
X9
①
⑨
⑫
⑪
(3x)
⑬
⑭

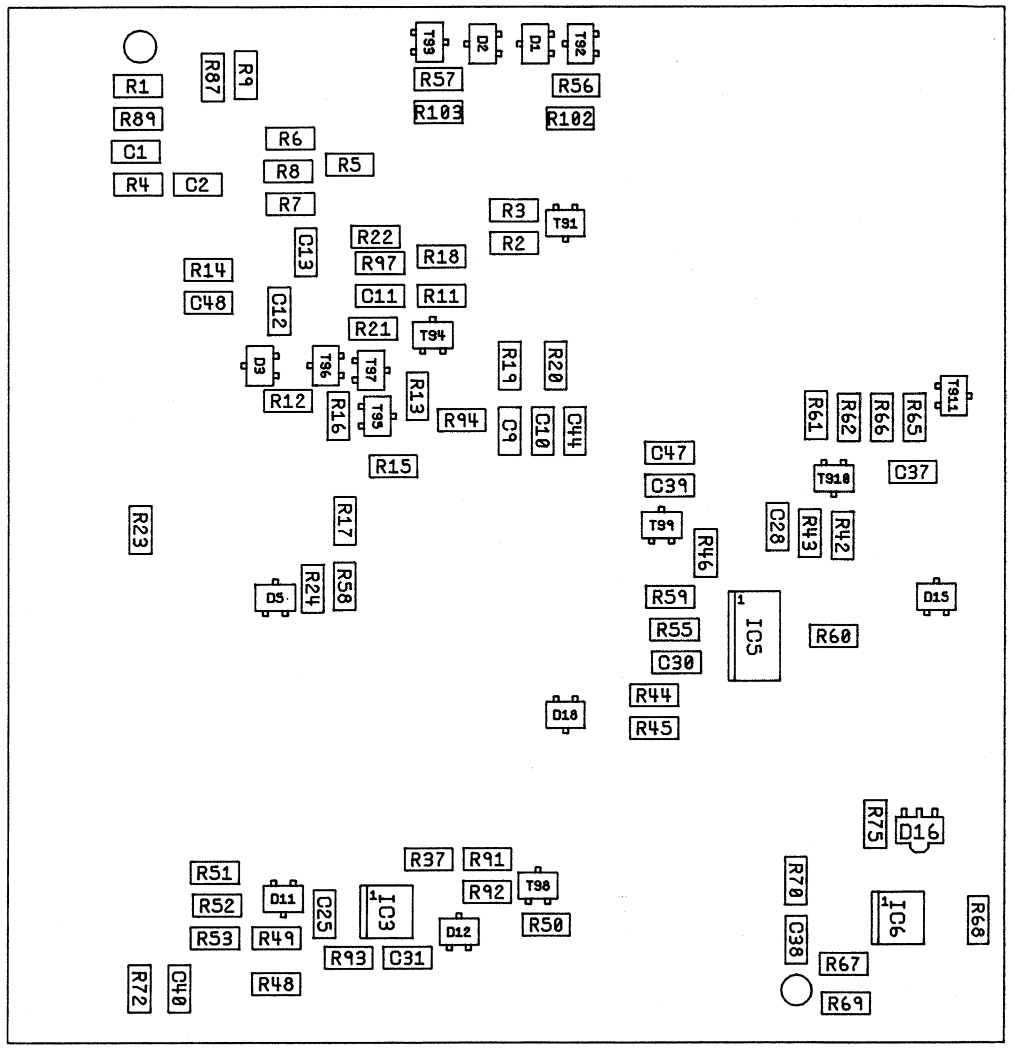
SD0439T

PC BOARD
PRENTPANEEL 3922 151 90850

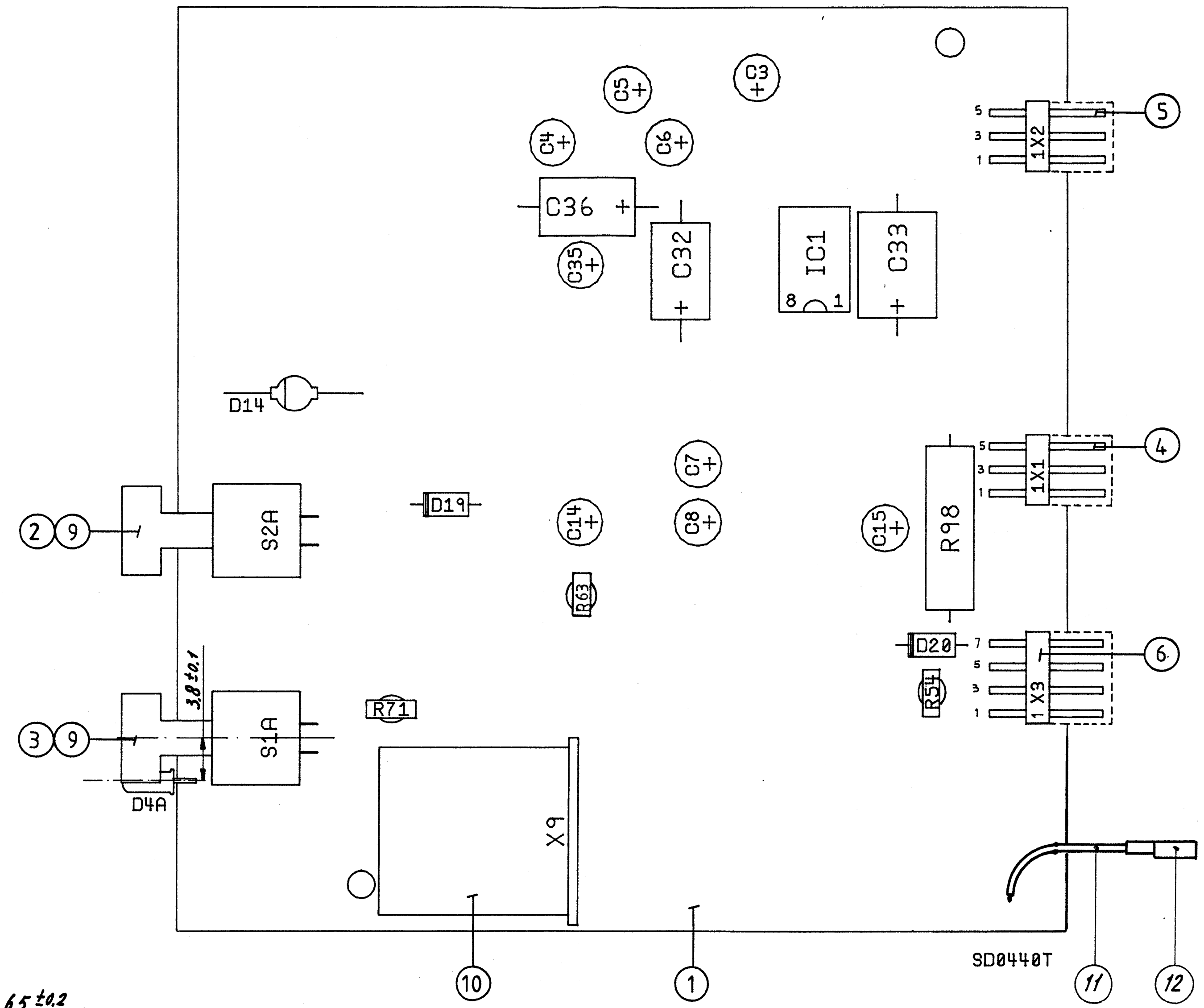

6,5 ±0,2
K (2x)
1,2 ±0,1


FLOOR
X10-3
X9-3
X3-2
X10-4
X3-1
GROUND REFERENCE (FLOOR)
X9-4
X2-3
X2-4
X2-1
TS 1
BC847C
C 35
22µ
R 1
5K6
MP 5
C 36
47µ
+15
R 2
47k
R 3
390
R 5
47k
R 8
220k
R 6
33k
MP 3
R 89
0
C 1
10n
R 4
10k
C 2
100n
R 7
1k
C 12
100p
IC 1a
LF353N
MP 7
MP 9
D 3
BZX84
C5V1
R 12
100k
TS 4
BC847C
MIC
D 4a
CQW54
TS 2
BC 857C
MP 4
D 1
BAV70
D 2
BAV70
MP 2
R 56
15k
R 57
15k
TS 3
BC847C
C 4
4µ7
R 102
1M
C 5
0,47µ
R 103
1M
C 6
4µ7
R 11
10 k
C 48
470p
R 14
560
X2-5
X2-6
C 3
10µ
R 9
220
R 87
0
MP 12
R 13
10k
R 94
680
MP 14
R 58
12k
R 17
12k
R 15
100k
R 16
1k5
C 8
4µ7
C 7
47µ
TS 5
BC847C
MP 17
MP 16
C 9
3n3
R 19
100k
+1/2 V
R 18
1M
C 10
100n
C 44
100n
R 20
18k
C 13
100p
IC 1b
R 21
100
C 11
47p
R 97
100k
R 22
100k
+V
TS 6
BC817-40
TS 7
BC807-40
C 14
22µ
+Va
R 98
390
X1-6
X1-2
X1-1
LS
Ⓘ/PRIORITY
S2a
C 37
10 n
D 14
BYW56
MP 23
R 62
100k
R 61
100k
TS 10
BC857C
MP 21
R 65
47k
TS 11
BC817-40
R 66
10k
D 18
BAV70
R 63
25
+t°
MP 26
X10-5
X3-8
REMOTE
D 19
BZV46
C2V0
3x
D 5
BAV70
R 24
100k
R 23
22k
C 15
4µ7
X1-5
X1-4
R 59
2k7
X10-1
X3-5
PRIORITY
X9-1
MP 27
R 91
0
R 37
1M
C 25
100p
IC 3a
LM393D
+6
R 60
100k
MP 22
R 44
1M
R 45
100k
C 30
100p
IC 5a
HEF4013BT
S
1D
C1
R
R 55
100k
MP 13
MP 19
R 46
47k
C 39
100n
C 47
100n
R 71
25
TS 9
BC817-40
D 16
BZV49
C6V2
R 75
100k
X3-7
X10-6
REM
X10-2
X3-6
DISABLE REQ.
X9-2
X10-7
X3-3
+V
R 54
25
X9-7
CASE
X13-1
X13-2
R 72
10k
C 40
100n
X10-8
X3-4
X9-8
C 33
47µ
R 51
68k
MP 28
+2/3 V
R 52
33k
MP 37
+1/2 V
R 53
100k
C 32
47µ
D 20
BZX79
C 30
R 49
100k
MP 38
R 50
27k
TS 8
BC 817-40
MP 29
+V
+15
R 92
82k
MP 36
+6
R 48
150k
R 93
68k
D 12
BAV70
C 31
100p
IC 3b
MP 32
D 11
BZX84
C15
R 67
1M
R 68
100k
MP 35
R 69
33k
IC 6
MC1741CD
MP 34
C 38
10n
R 70
100k
MP 25
D 15
BAV70
S1a
MP 20
C 28
10n
R 42
1k
R 43
100k
IC 5b
NOT USED
TOP VIEW
BAV70
BZX84
BZV46
BYW56
CQW54
TLUG164
BZV49
BC847C
BC817-40
BC857C
BC807-40

| NO | TYPE | + V | +15 | ⊥ |
|---|---|---|---|---|
| 1 | LF353N | 8 |  | 4 |
|  |  |  |  |  |
| 3 | LM393D | 8 |  | 4 |
| 5 | HEF4013BT |  | 14 | 7 |
| 6 | MC1741CD |  | 7 | 14 |
|  |  |  |  |  |

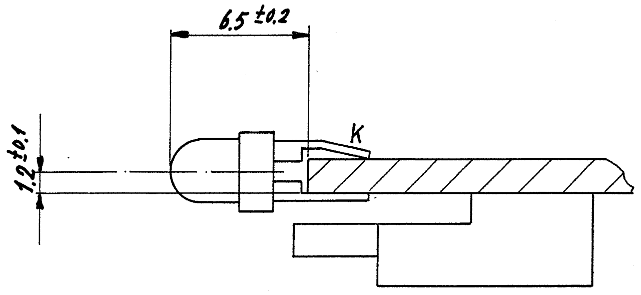

R1
R89
C1
R4
C2
R87
R9
R6
R8
R5
R7
TS3
D2
D1
TS2
R57
R103
R56
R102
R3
R2
TS1
R22
R97
R18
C11
R11
R21
TS4
C13
C12
R14
C48
D3
TS6
TS7
R12
R16
TS5
R13
R94
R19
R20
C9
C10
C44
R15
R17
R23
D5
R24
R58
C47
C39
TS9
R46
C28
R43
R42
R61
R62
R66
R65
TS11
TS10
C37
R59
R55
C30
1
IC5
R60
D15
D18
R44
R45
R75
D16
R70
C38
1
IC6
R68
R67
R69
R51
R52
R53
D11
R49
C25
1
IC3
R37
R91
R92
TS8
D12
R50
R93
C31
R48
R72
C40

SD0440B

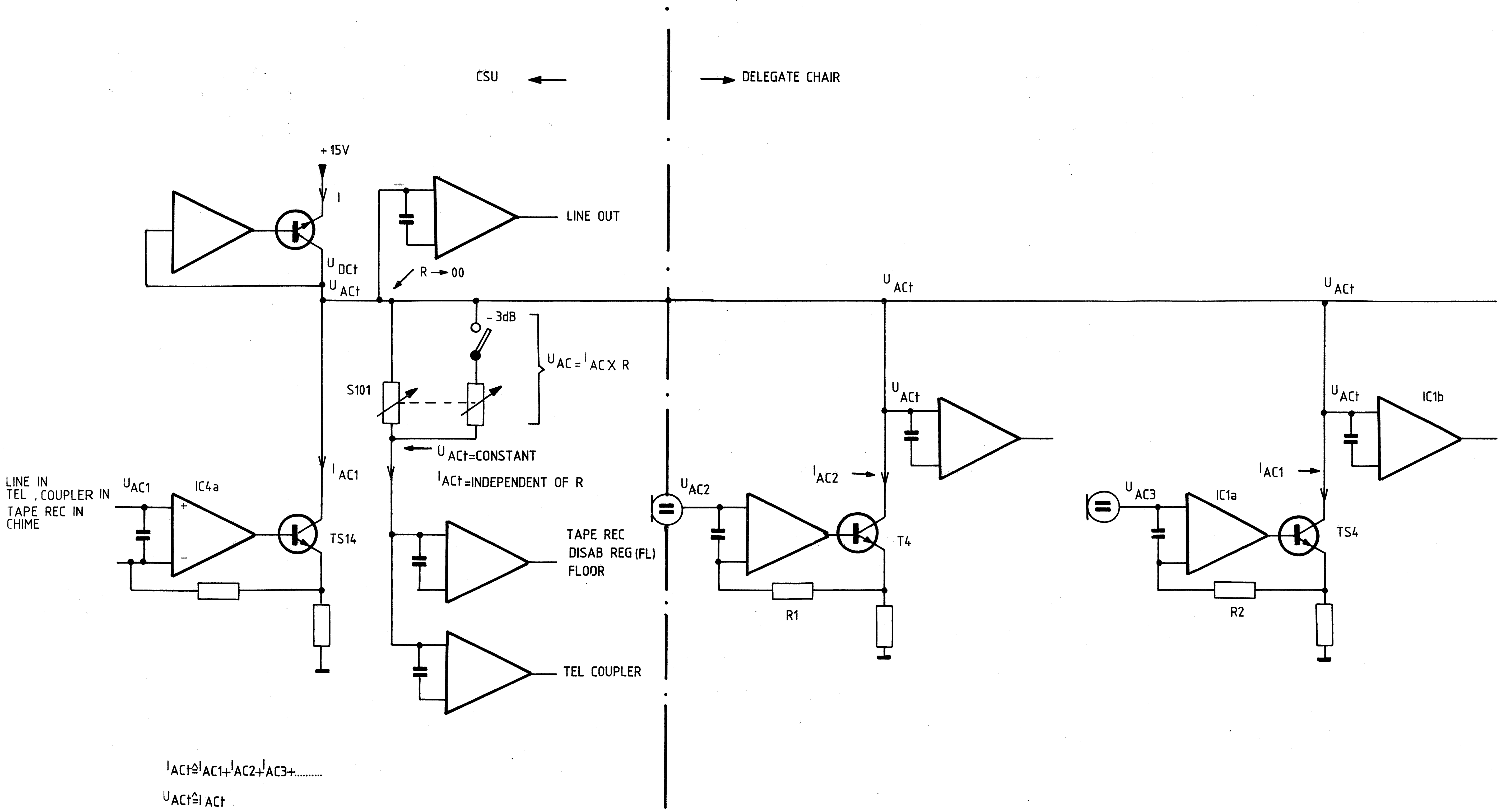

C3
C5
C4
C6
C36
C32
IC1
8
1
C33
C35
5
3
1
1X2
5
D14
C7
C8
C14
D19
C15
R98
5
3
1
1X1
4
S2A
2
9
R63
7
5
3
1
D20
1X3
6
R54
3,8 ±0,1
S1A
3
9
D4A
R71
X9
10
1
11
12

SD0440T

PC BOARD
PRENTPANEEL 3922 151 90850



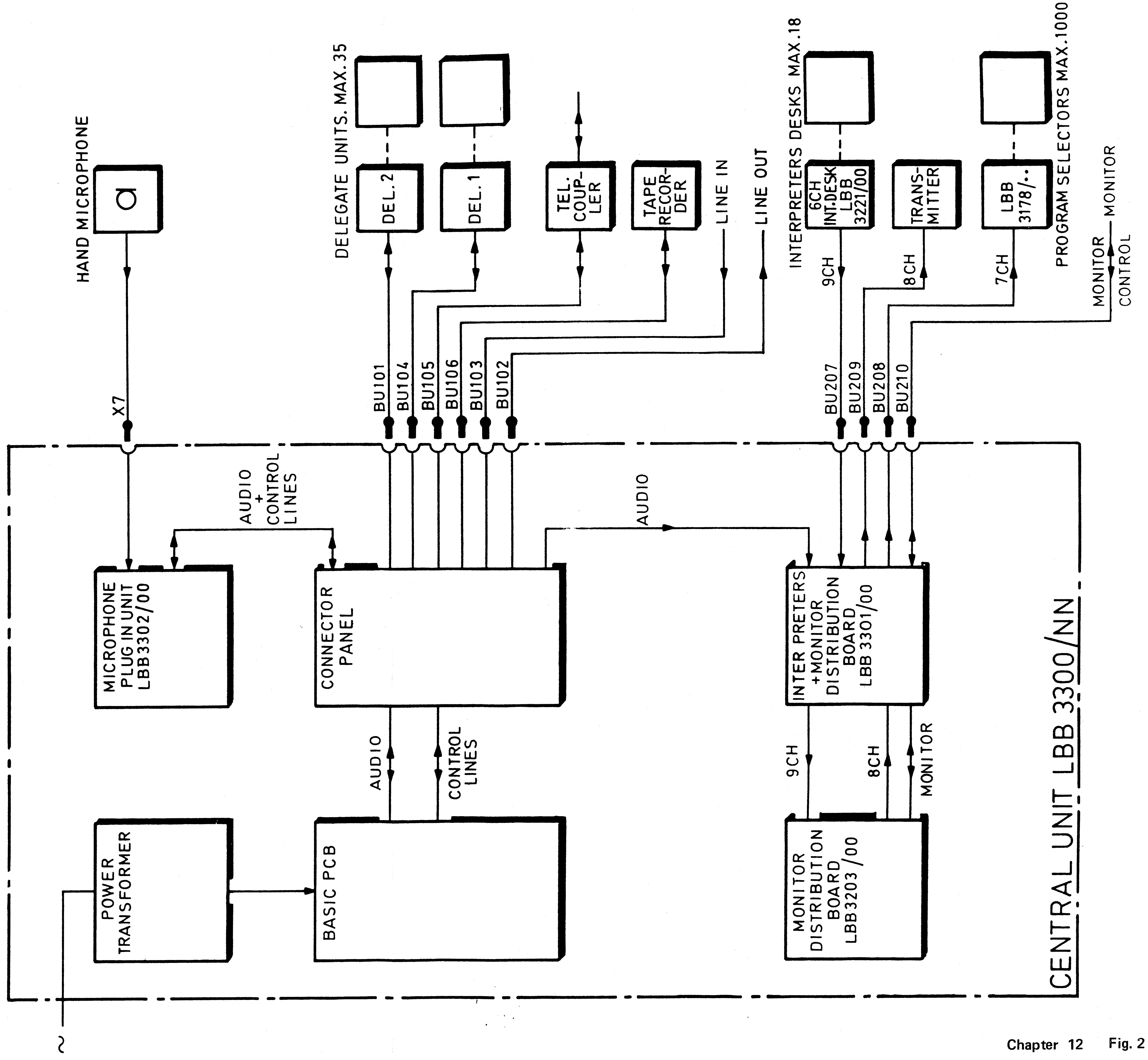
## CCS400 AUDIO PRINCIPLE


CSU
DELEGATE CHAIR
+15V
I
U DCt
U ACt
R → 00
LINE OUT
- 3dB
U AC = I AC X R
S101
U ACt=CONSTANT
I ACt=INDEPENDENT OF R
I AC1
LINE IN
TEL . COUPLER IN
TAPE REC IN
CHIME
U AC1
IC4a
+
−
TS14
TAPE REC
DISAB REG (FL)
FLOOR
TEL COUPLER
U ACt
U ACt
U AC2
I AC2
T4
R1
U ACt
U ACt
IC1b
U AC3
IC1a
I AC1
TS4
R2

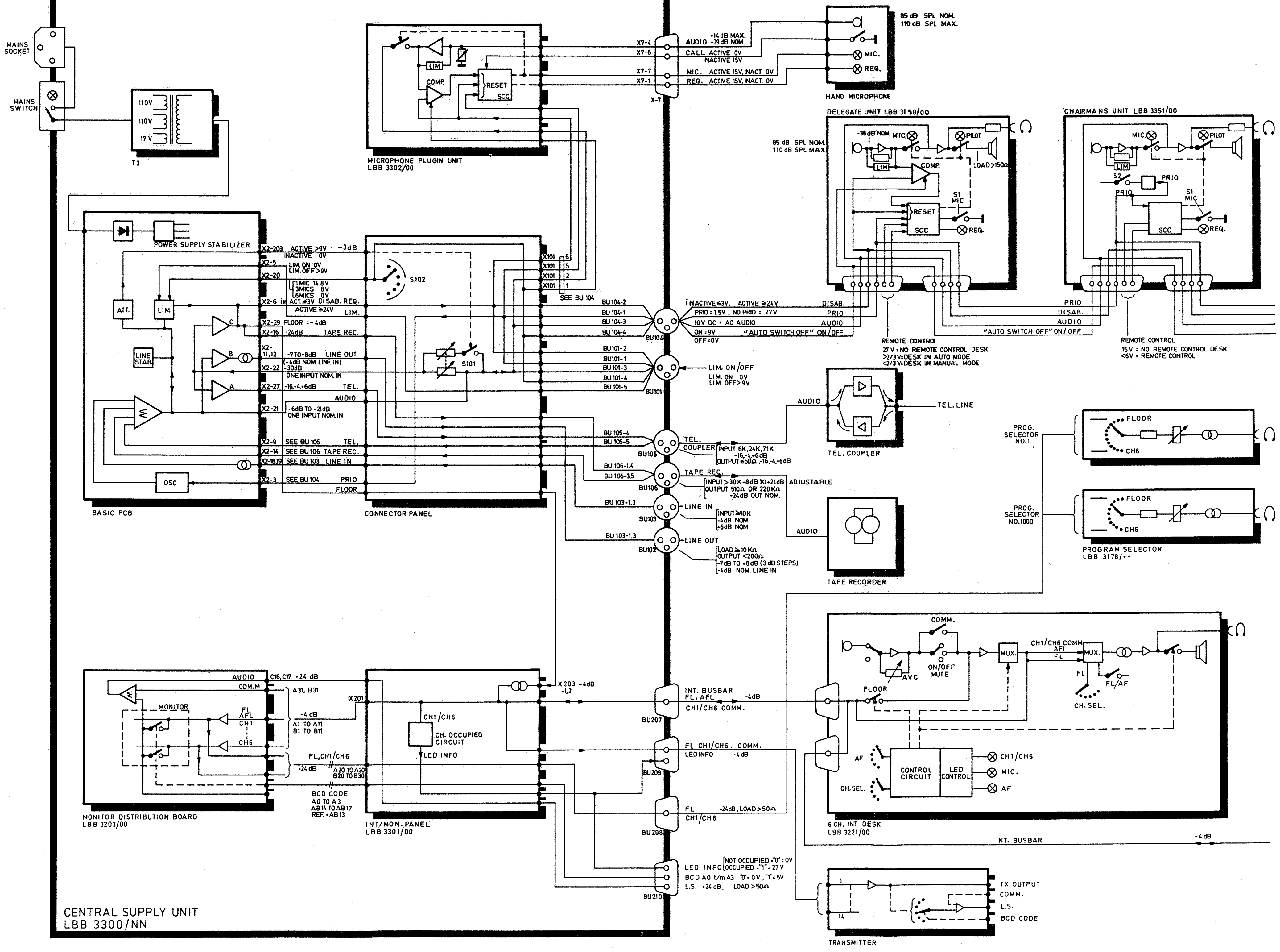
$I_{ACt} \hat{=} I_{AC1} + I_{AC2} + I_{AC3} + \ldots\ldots\ldots$

$U_{ACt} \hat{=} I_{ACt}$

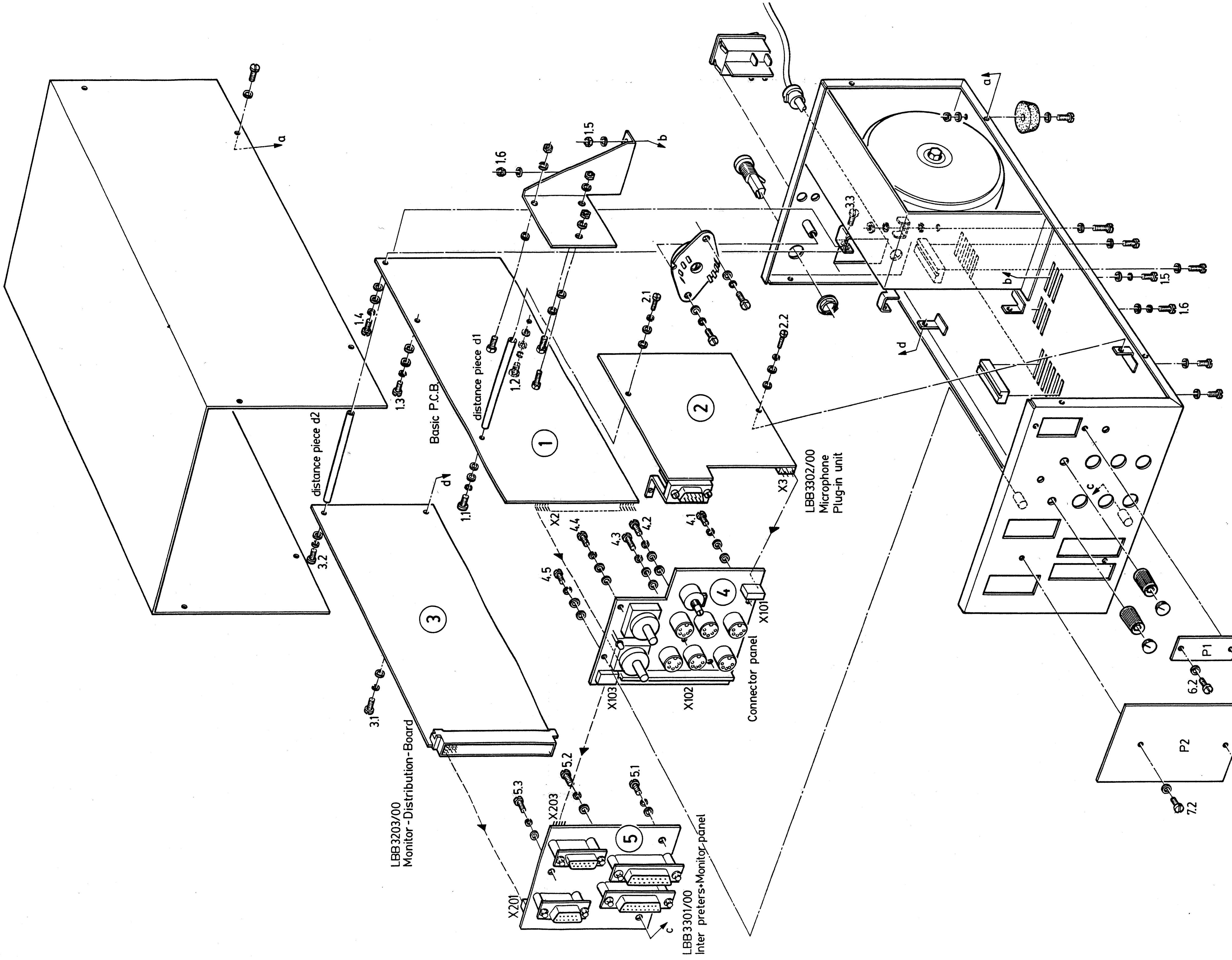
**SYSTEM BLOC DIAGRAM C.S.U.**


HAND MICROPHONE
X7
DELEGATE UNITS. MAX. 35
DEL. 2
DEL. 1
TEL. COUP-LER
TAPE RECOR-DER
LINE IN
LINE OUT
BU101
BU104
BU105
BU106
BU103
BU102
INTERPRETERS DESKS MAX. 18
6CH INT. DESK LBB 3221/00
TRANS-MITTER
LBB 3178/..
PROGRAM SELECTORS MAX. 1000
MONITOR
MONITOR CONTROL
9CH
8CH
7CH
BU207
BU209
BU208
BU210
AUDIO + CONTROL LINES
AUDIO
MICROPHONE PLUG IN UNIT LBB 3302/00
CONNECTOR PANEL
INTER PRETERS + MONITOR DISTRIBUTION BOARD LBB 3301/00
AUDIO
CONTROL LINES
9CH
8CH
MONITOR
POWER TRANSFORMER
BASIC PCB
MONITOR DISTRIBUTION BOARD LBB 3203/00
CENTRAL UNIT LBB 3300/NN
~

# DETAILED BLOCK DIAGRAM C.S.U. AND PERIPHERALS WITH FIRST LINE DATA


MAINS SOCKET
MAINS SWITCH
110V
110V
17V
T3
MICROPHONE PLUGIN UNIT
LBB 3302/00
LIM
COMP.
RESET
SCC
X7-4
X7-6
X7-7
X7-1
X-7
-14 dB MAX.
AUDIO -39 dB NOM.
CALL ACTIVE 0V
INACTIVE 15V
MIC. ACTIVE 15V, INACT. 0V
REQ. ACTIVE 15V, INACT. 0V
85 dB SPL NOM.
110 dB SPL MAX.
MIC.
REQ.
HAND MICROPHONE
POWER SUPPLY STABILIZER
ATT.
LIM.
LINE STAB.
OSC
A
B
C
BASIC PCB
X2-203 ACTIVE >9V -3dB
INACTIVE 0V
X2-5 LIM. ON 0V
LIM. OFF >9V
X2-20 1 MIC 14.8V
3 MICS 8V
6 MICS 0V
X2-6 IN ACT. ≤3V DISAB. REQ.
ACTIVE ≥24V LIM.
X2-29 FLOOR = -4dB
X2-16 -24dB TAPE REC.
X2-11,12 -7 TO +8dB LINE OUT
(-4dB NOM. LINE IN)
X2-22 -30dB
ONE INPUT NOM. IN
X2-27 -16,-4,+6dB TEL.
AUDIO
X2-21 -6dB TO -21dB
ONE INPUT NOM. IN
X2-9 SEE BU 105 TEL.
X2-14 SEE BU 106 TAPE REC.
X2-18,19 SEE BU 103 LINE IN
X2-3 SEE BU 104 PRIO
FLOOR
S102
S101
X101 6
X101 5
X101 2
X101 1
SEE BU 104
CONNECTOR PANEL
BU 104-2
BU 104-1
BU 104-3
BU 104-4
BU104
INACTIVE ≤3V, ACTIVE ≥24V DISAB.
PRIO = 1.5V, NO PRIO = 27V PRIO
10V DC + AC AUDIO AUDIO
ON = 9V "AUTO SWITCH OFF" ON/OFF
OFF = 0V
BU101-2
BU101-1
BU 101-3
BU 101-4
BU 101-5
BU101
LIM. ON/OFF
LIM. ON 0V
LIM OFF>9V
BU 105-4
BU 105-5
BU105
TEL. COUPLER
INPUT 6K, 24K, 71K
-16,-4,+6dB
OUTPUT ≤50Ω, -16,-4,+6dB
BU 106-1,4
BU 106-3,5
BU106
TAPE REC.
INPUT >30K -8dB TO +21dB ADJUSTABLE
OUTPUT 510Ω OR 220KΩ
-24dB OUT NOM.
BU 103-1,3
BU103
LINE IN
INPUT ≥10K
-4dB NOM
+6dB NOM
BU 103-1,3
BU102
LINE OUT
LOAD ≥10KΩ
OUTPUT <200Ω
-7dB TO +8dB (3 dB STEPS)
-4dB NOM. LINE IN
DELEGATE UNIT LBB 3150/00
85 dB SPL NOM.
110 dB SPL MAX.
-36 dB NOM.
MIC.
PILOT
LIM
COMP.
LOAD >150Ω
S1 MIC
RESET
SCC
REQ.
REMOTE CONTROL
27 V = NO REMOTE CONTROL DESK
>2/3 V=DESK IN AUTO MODE
<2/3 V=DESK IN MANUAL MODE
CHAIRMANS UNIT LBB 3351/00
MIC.
PILOT
LIM
S2
PRIO
PRIO
S1 MIC
SCC
REQ.
PRIO
DISAB.
AUDIO
"AUTO SWITCH OFF" ON/OFF
REMOTE CONTROL
15 V = NO REMOTE CONTROL DESK
<6V = REMOTE CONTROL
AUDIO
TEL. LINE
TEL. COUPLER
AUDIO
TAPE RECORDER
PROG. SELECTOR NO.1
FLOOR
CH6
PROG. SELECTOR NO.1000
FLOOR
CH6
PROGRAM SELECTOR
LBB 3178/••
AUDIO C16, C17 +24 dB
COM.M A31, B31
MONITOR
FL
AFL
CH1
CH6
-4 dB
A1 TO A11
B1 TO B11
FL, CH1/CH6
+24 dB
A20 TO A30
B20 TO B30
BCD CODE
A0 TO A3
AB14 TO AB17
REF. = AB13
MONITOR DISTRIBUTION BOARD
LBB 3203/00
X201
CH1/CH6
CH. OCCUPIED CIRCUIT
LED INFO
INT/MON. PANEL
LBB 3301/00
X 203 -4dB
-1,2
INT. BUSBAR
FL, AFL -4dB
CH1/CH6 COMM.
BU207
FL CH1/CH6. COMM.
LED INFO -4 dB
BU209
FL +24dB, LOAD >50Ω
CH1/CH6
BU208
LED INFO NOT OCCUPIED = "0" = 0V
OCCUPIED = "1" = 27V
BCD A0 t/m A3 "0" = 0V, "1" = 5V
L.S. +24 dB, LOAD >50Ω
BU210
CENTRAL SUPPLY UNIT
LBB 3300/NN
COMM.
AVC
ON/OFF MUTE
FLOOR
MUX.
CH1/CH6 COMM
AFL
FL
MUX.
FL
FL/AF
CH. SEL.
AF
CH. SEL.
CONTROL CIRCUIT
LED CONTROL
CH1/CH6
MIC.
AF
6 CH. INT DESK
LBB 3221/00
INT. BUSBAR
-4 dB
1
14
TX OUTPUT
COMM.
L.S.
BCD CODE
TRANSMITTER

# EXPLODED VIEW C.S.U.


a
a
b
b
1.6
1.5
3.3
1.5
1.6
d
1.4
1.3
1.2
Basic P.C.B.
distance piece d1
distance piece d2
d
1.1
2.1
2.2
1
2
X3
LBB3302/00
Microphone
Plug-in unit
X2
4.4
4.3
4.2
4.1
4.5
4
X101
Connector panel
X102
X103
3
3.2
3.1
LBB3203/00
Monitor-Distribution-Board
5.3
5.2
5.1
X203
5
X201
c
LBB3301/00
Inter preters+Monitor panel
c
P1
6.2
6.1
P2
7.2
7.1

Chapter 12 Fig. 4

Fig.1 Blockdiagram Audio part of uP/Switch board

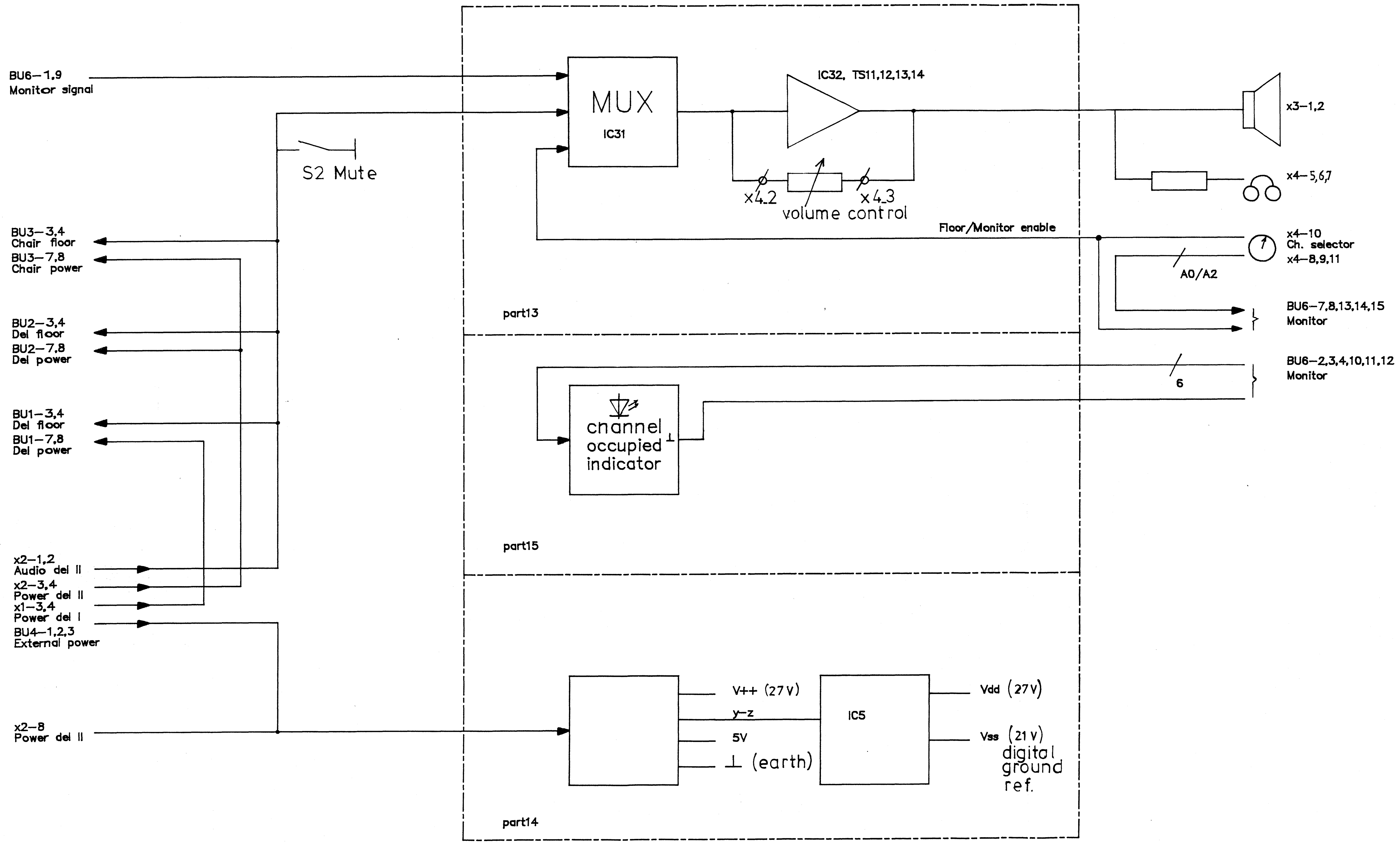
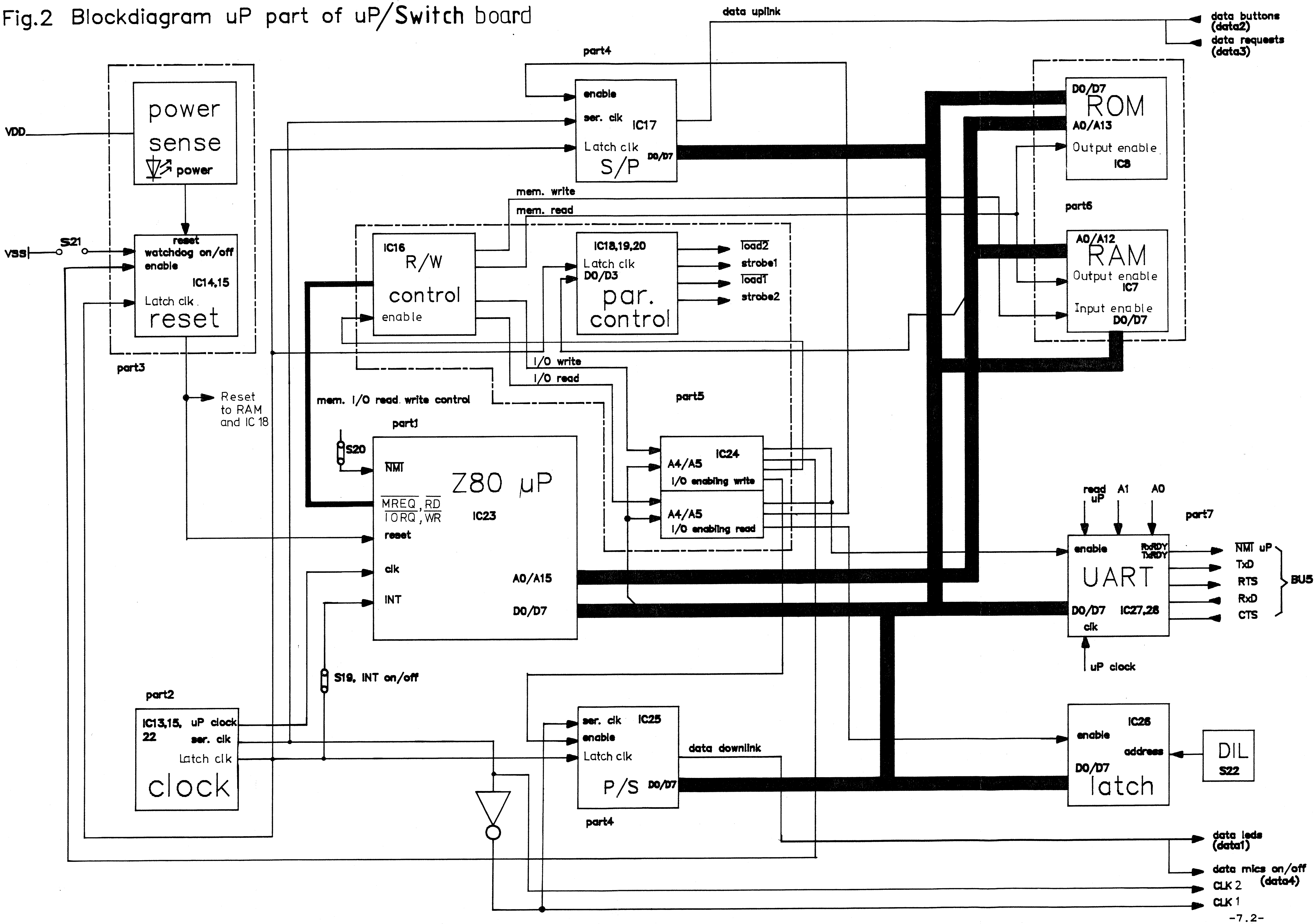
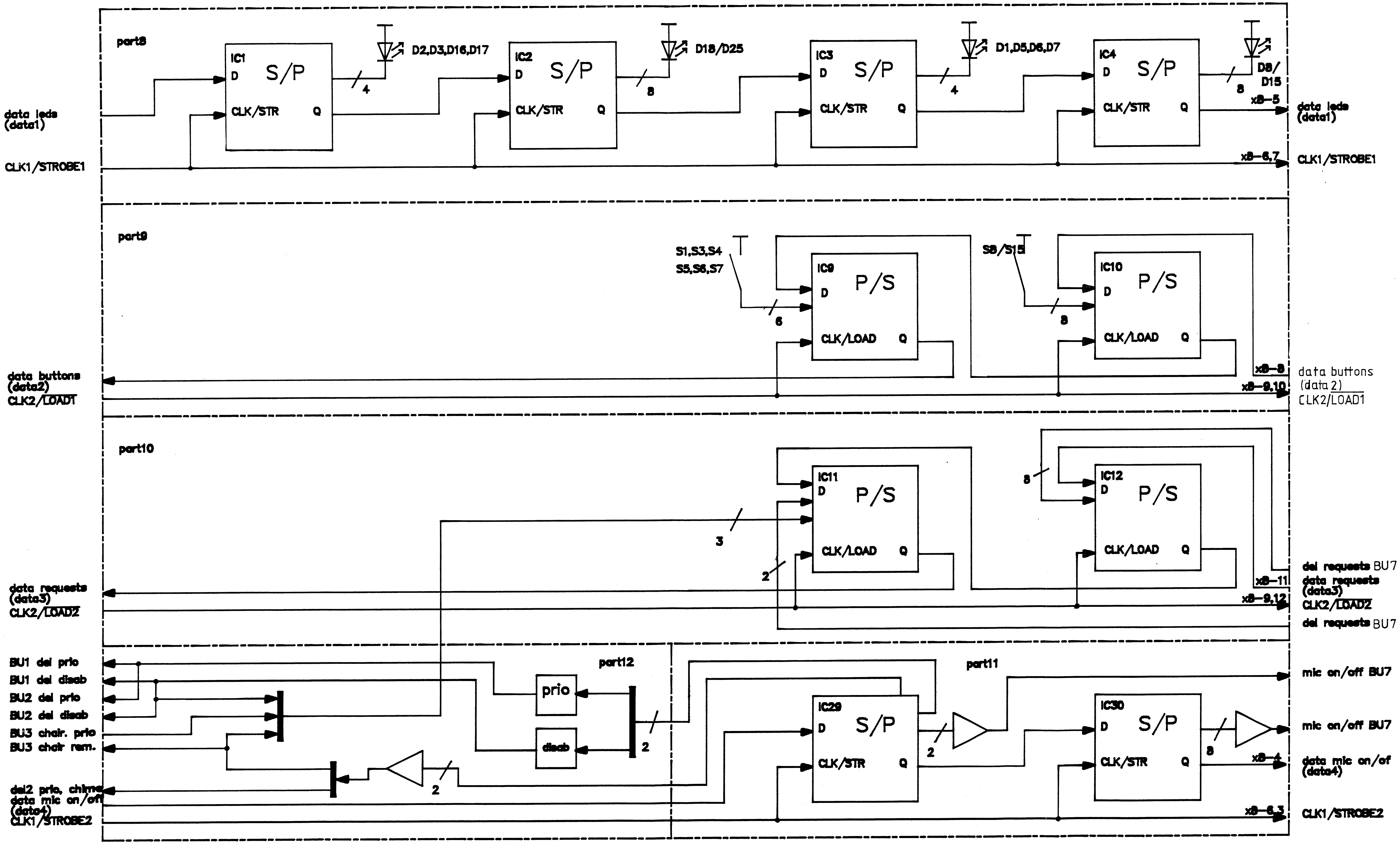

BU6–1.9
Monitor signal
MUX
IC31
S2 Mute
IC32, TS11,12,13,14
x4.2
x4.3
volume control
x3–1,2
x4–5,6,7
Floor/Monitor enable
x4–10
Ch. selector
x4–8,9,11
A0/A2
BU6–7,8,13,14,15
Monitor
BU6–2,3,4,10,11,12
Monitor
6
BU3–3,4
Chair floor
BU3–7,8
Chair power
BU2–3,4
Del floor
BU2–7,8
Del power
BU1–3,4
Del floor
BU1–7,8
Del power
part13
channel occupied indicator
part15
x2–1,2
Audio del II
x2–3,4
Power del II
x1–3,4
Power del I
BU4–1,2,3
External power
x2–8
Power del II
V++ (27V)
y–z
5V
⊥ (earth)
IC5
Vdd (27V)
Vss (21V)
digital ground ref.
part14

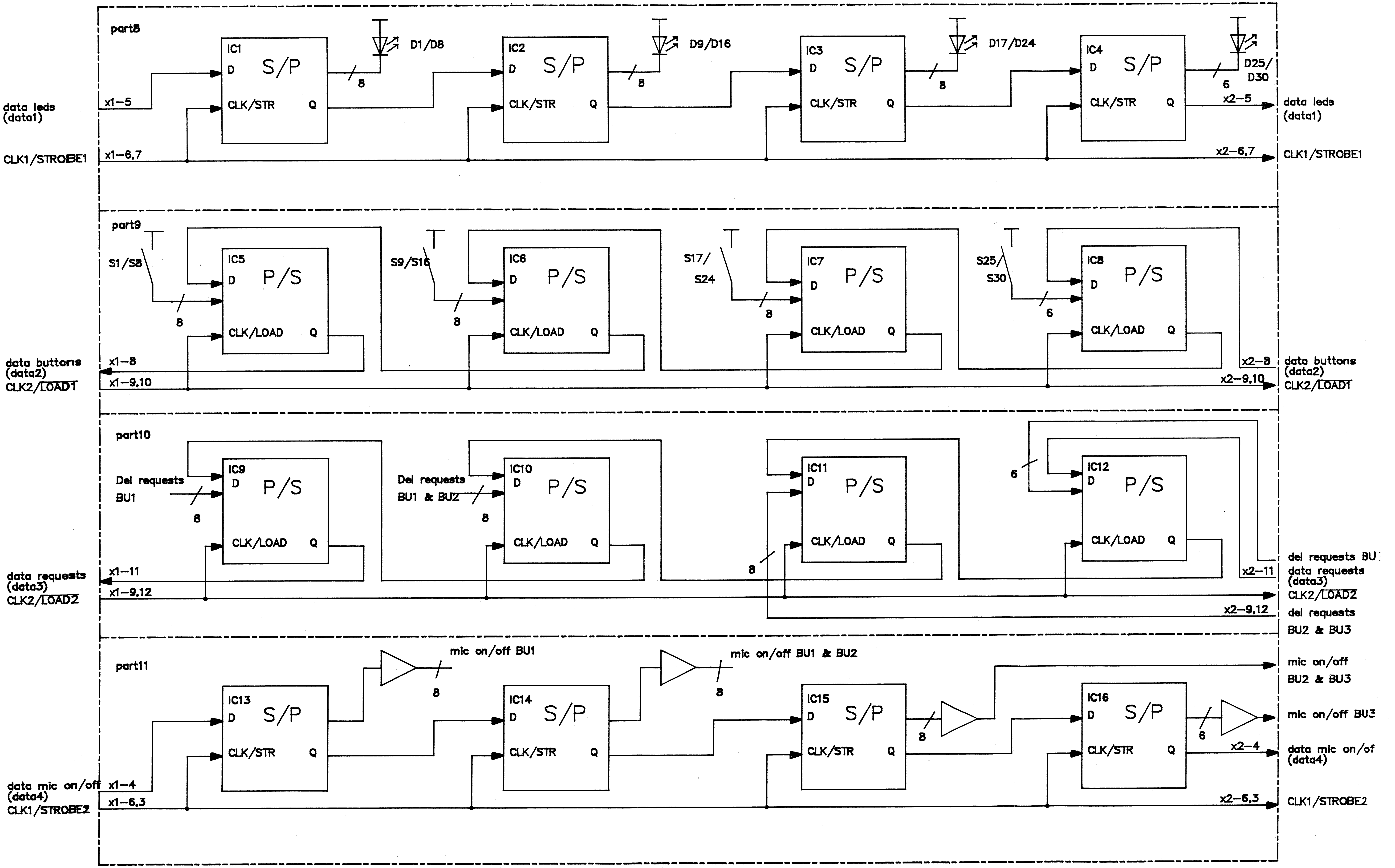
Fig.2 Blockdiagram uP part of uP/Switch board


data uplink
data buttons (data2)
data requests (data3)
part4
enable
ser. clk
IC17
Latch clk
S/P
D0/D7
power sense
power
VDD
VSS
S21
reset
watchdog on/off
enable
IC14,15
Latch clk
reset
part3
Reset to RAM and IC 18
D0/D7
ROM
A0/A13
Output enable
IC8
part6
A0/A12
RAM
Output enable
IC7
Input enable
D0/D7
mem. write
mem. read
IC16
R/W
control
enable
IC18,19,20
Latch clk
D0/D3
par. control
load2
strobe1
load1
strobe2
I/O write
I/O read
part5
mem. I/O read. write control
part1
S20
NMI
Z80 uP
MREQ, RD
IORQ, WR
IC23
reset
clk
INT
A0/A15
D0/D7
IC24
A4/A5
I/O enabling write
A4/A5
I/O enabling read
read uP
A1
A0
part7
enable
RxRDY
TxRDY
UART
D0/D7
IC27,28
clk
uP clock
NMI uP
TxD
RTS
RxD
CTS
BUS
S19, INT on/off
part2
IC13,15, 22
uP clock
ser. clk
Latch clk
clock
ser. clk
IC25
enable
Latch clk
P/S
D0/D7
data downlink
part4
enable
IC26
address
D0/D7
latch
DIL
S22
data leds (data1)
data mics on/off (data4)
CLK 2
CLK 1

# Fig.3 Blockdiagram I/O/Switch part of up/Switch board


part8
IC1
D
S/P
CLK/STR
Q
4
D2,D3,D16,D17
IC2
D
S/P
CLK/STR
Q
8
D18/D25
IC3
D
S/P
CLK/STR
Q
4
D1,D5,D6,D7
IC4
D
S/P
CLK/STR
Q
8
D8/
D15
x8-5
data leds
(data1)
CLK1/STROBE1
x8-6,7
data leds
(data1)
CLK1/STROBE1
part9
S1,S3,S4
S5,S6,S7
6
IC9
D
P/S
CLK/LOAD
Q
S8/S15
8
IC10
D
P/S
CLK/LOAD
Q
x8-8
x8-9,10
data buttons
(data2)
CLK2/LOAD1
data buttons
(data 2)
CLK2/LOAD1
part10
IC11
D
P/S
CLK/LOAD
Q
3
2
8
IC12
D
P/S
CLK/LOAD
Q
del requests BU7
x8-11
data requests
(data3)
x8-9,12
CLK2/LOAD2
del requests BU7
data requests
(data3)
CLK2/LOAD2
BU1 del prio
BU1 del disab
BU2 del prio
BU2 del disab
BU3 chair. prio
BU3 chair rem.
del2 prio, chime
data mic on/off
(data4)
CLK1/STROBE2
part12
prio
disab
2
2
part11
IC29
D
S/P
CLK/STR
Q
2
IC30
D
S/P
CLK/STR
Q
8
mic on/off BU7
mic on/off BU7
x8-4
data mic on/of
(data4)
x8-6,3
CLK1/STROBE2

# Fig.4 Blockdiagram I/O/Switch board


part8
IC1 S/P D CLK/STR Q
IC2 S/P D CLK/STR Q
IC3 S/P D CLK/STR Q
IC4 S/P D CLK/STR Q
D1/D8
D9/D16
D17/D24
D25/D30
8
6
data leds (data1)
x1–5
CLK1/STROBE1
x1–6,7
x2–5
x2–6,7
part9
S1/S8
S9/S16
S17/S24
S25/S30
IC5 P/S D CLK/LOAD Q
IC6 P/S D CLK/LOAD Q
IC7 P/S D CLK/LOAD Q
IC8 P/S D CLK/LOAD Q
data buttons (data2)
CLK2/LOAD1
x1–8
x1–9,10
x2–8
x2–9,10
part10
Del requests BU1
Del requests BU1 & BU2
IC9 P/S D CLK/LOAD Q
IC10 P/S D CLK/LOAD Q
IC11 P/S D CLK/LOAD Q
IC12 P/S D CLK/LOAD Q
data requests (data3)
CLK2/LOAD2
x1–11
x1–9,12
x2–11
x2–9,12
del requests BU
del requests BU2 & BU3
part11
mic on/off BU1
mic on/off BU1 & BU2
IC13 S/P D CLK/STR Q
IC14 S/P D CLK/STR Q
IC15 S/P D CLK/STR Q
IC16 S/P D CLK/STR Q
mic on/off BU2 & BU3
mic on/off BU3
data mic on/off (data4)
CLK1/STROBE2
x1–4
x1–6,3
x2–4
x2–6,3

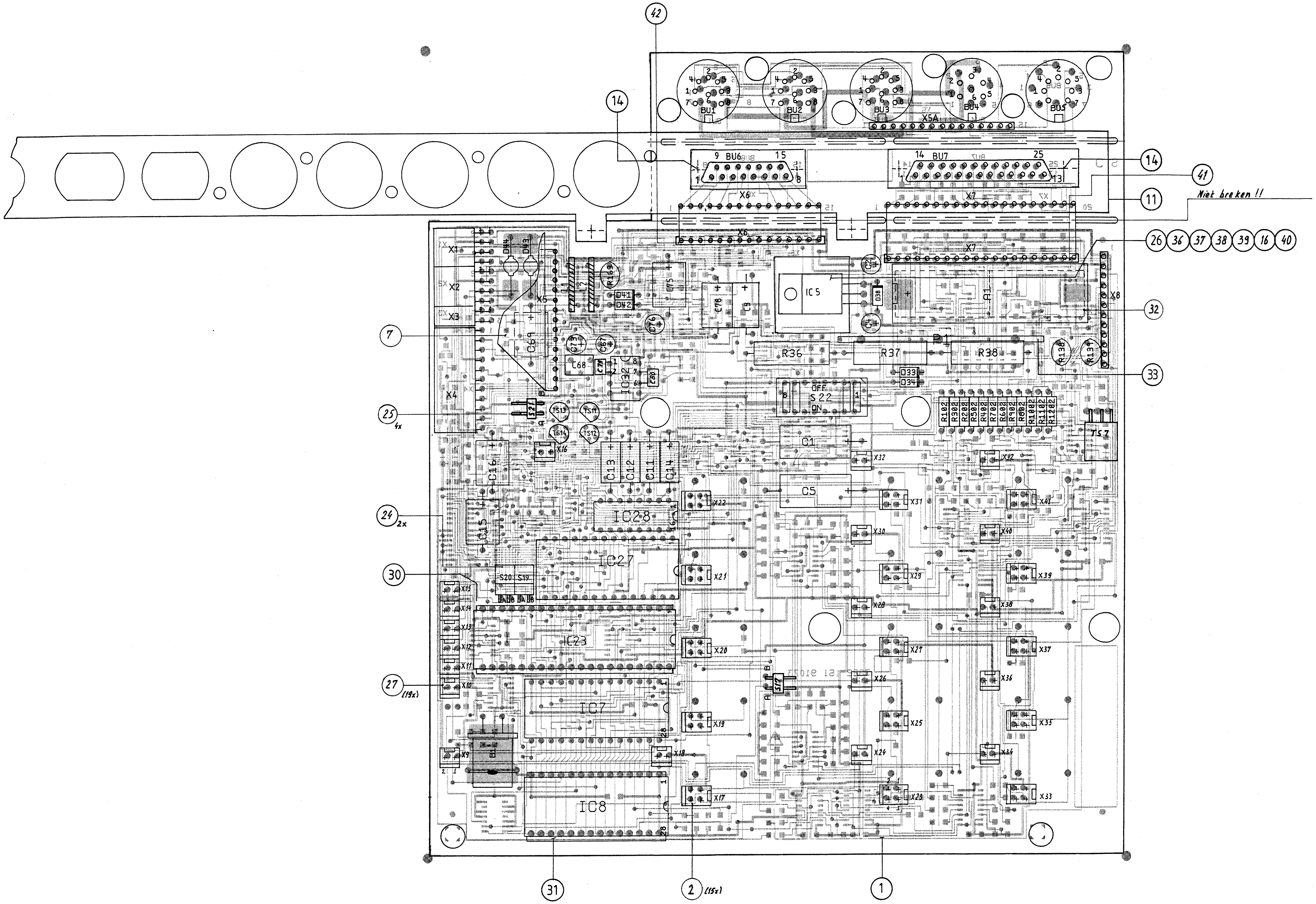

42
14
14
41
11
Niet breken !!
26
36
37
38
39
16
40
32
33
7
25
4x
24
2x
30
27
(19x)
31
2
(15x)
1
BU1
BU2
BU3
BU4
BU5
X5A
BU6
BU7
X6
X7
X8
X1
X2
X3
X4
X5
IC5
IC22
IC28
IC27
IC23
IC7
IC8
R36
R37
R38
R138
R137
S22
OFF
ON
C1
C5
C13
C12
C11
C14
C15
C16
C68
C69
C78
S20
S19
S17
TS7
D41
D42
D33
D34
X9
X10
X11
X12
X13
X14
X15
X16
X17
X18
X19
X20
X21
X22
X23
X24
X25
X26
X27
X28
X29
X30
X31
X32
X33
X34
X35
X36
X37
X38
X39
X40
X41
X42
B1

FIG. 5-1 ASSEMBLY DIAGRAM OF uP/SWITCH BOARD, TOP SIDE

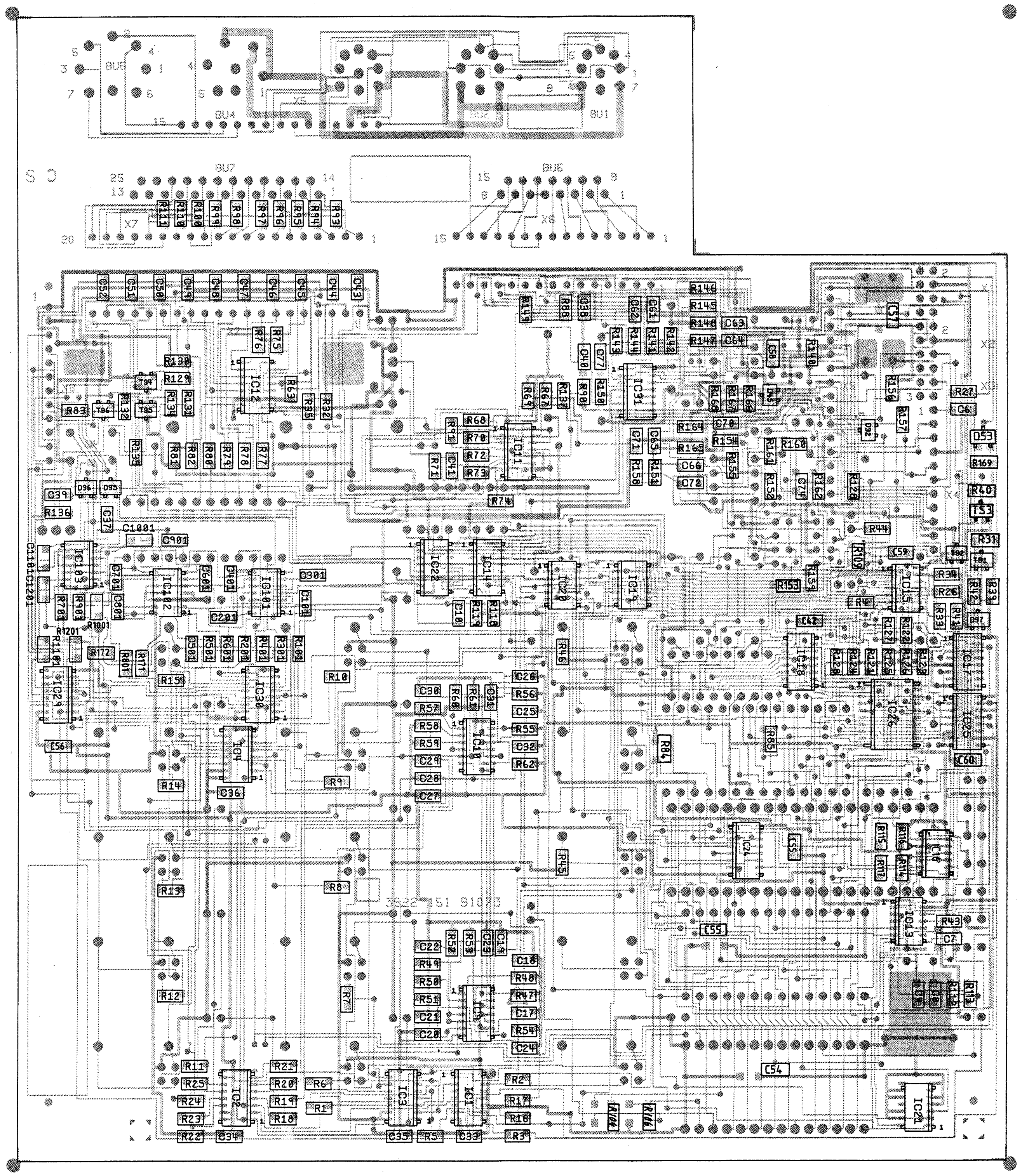
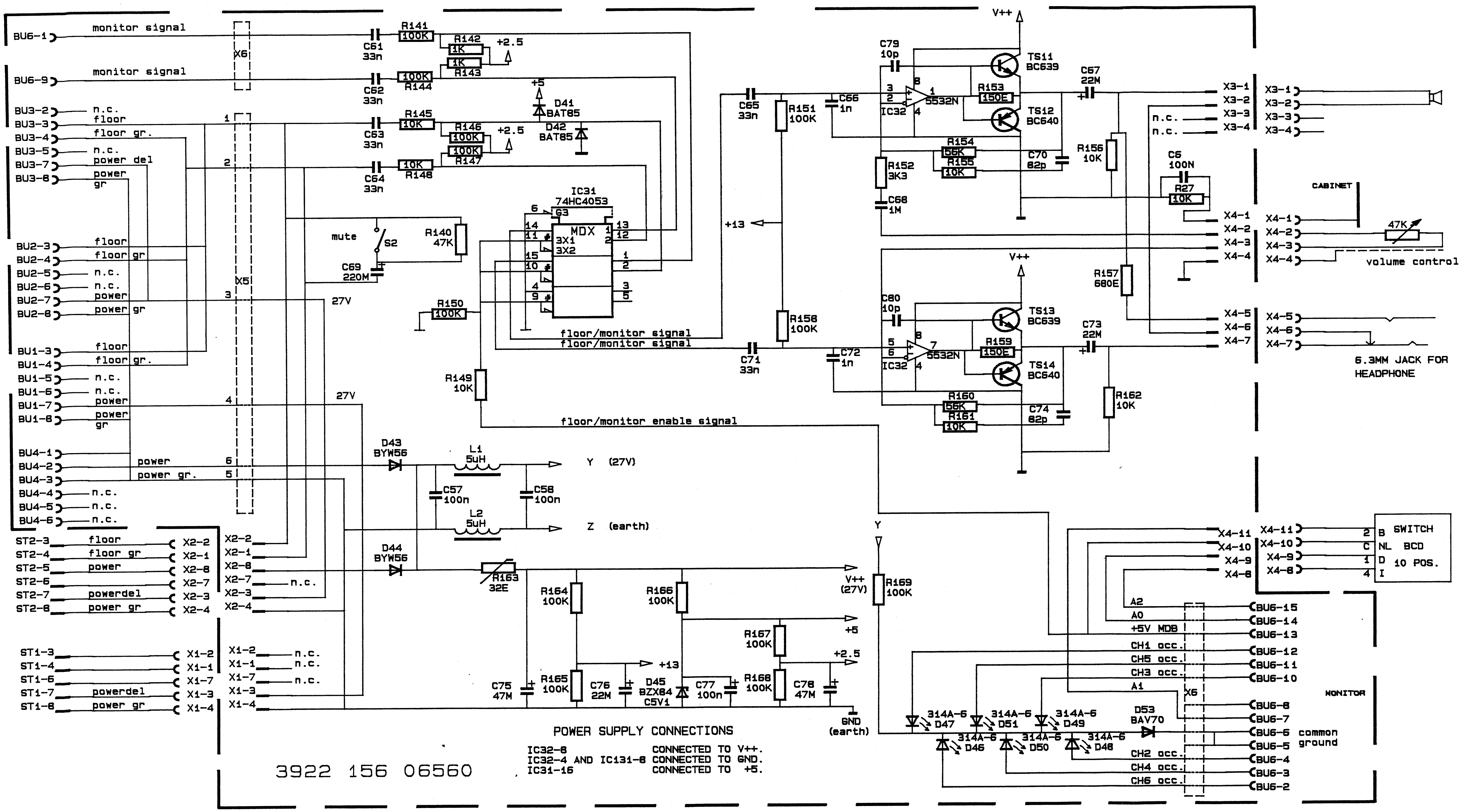

BU5
BU4
X5
BU1
BU7
BU6
X7
X6
X1
X2
X3
X4
IC12
IC11
IC31
IC103
IC102
IC101
IC29
IC30
IC4
IC22
IC14
IC20
IC19
IC18
IC26
IC25
IC24
IC13
IC2
IC3
IC1
IC21
C54
C55
C56
C57
C60
R84
R85

FIG. 5-2 ASSEMBLY DIAGRAM OF uP/SWITCH BOARD, BOTTOM SIDE

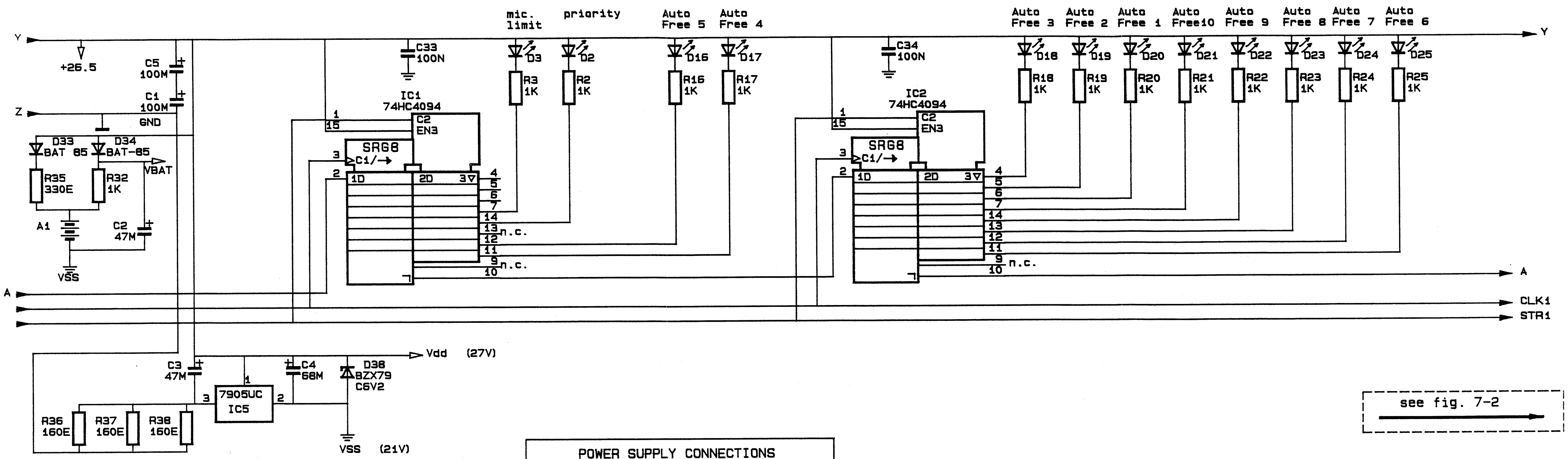

BU6-1
monitor signal
BU6-9
monitor signal
X6
BU3-2 n.c.
BU3-3 floor
BU3-4 floor gr.
BU3-5 n.c.
BU3-7 power del
BU3-8 power gr
BU2-3 floor
BU2-4 floor gr
BU2-5 n.c.
BU2-6 n.c.
BU2-7 power
BU2-8 power gr
BU1-3 floor
BU1-4 floor gr.
BU1-5 n.c.
BU1-6 n.c.
BU1-7 power
BU1-8 power gr
BU4-1
BU4-2 power
BU4-3 power gr.
BU4-4 n.c.
BU4-5 n.c.
BU4-6 n.c.
X5
ST2-3 floor X2-2
ST2-4 floor gr X2-1
ST2-5 power X2-8
ST2-6 X2-7
ST2-7 powerdel X2-3
ST2-8 power gr X2-4
ST1-3 X1-2
ST1-4 X1-1
ST1-6 X1-7
ST1-7 powerdel X1-3
ST1-8 power gr X1-4
X1-2 n.c.
X1-1 n.c.
X1-7 n.c.
X2-7 n.c.
C61 33n
C62 33n
C63 33n
C64 33n
R141 100K
R142 1K
R143 1K
R144 100K
R145 10K
R146 100K
R147 100K
R148 10K
+2.5
+5
D41 BAT85
D42 BAT85
mute
S2
C69 220M
R140 47K
27V
R150 100K
R149 10K
IC31 74HC4053
MDX
G3
3X1
3X2
floor/monitor signal
floor/monitor signal
floor/monitor enable signal
+13
C65 33n
R151 100K
C66 1n
C79 10p
IC32
5532N
TS11 BC639
TS12 BC640
R153 150E
R154 56K
R155 10K
R152 3K3
C68 1M
C70 82p
C67 22M
R156 10K
V++
R158 100K
C71 33n
C72 1n
C80 10p
TS13 BC639
TS14 BC640
R159 150E
R160 56K
R161 10K
C74 82p
C73 22M
R157 680E
R162 10K
C6 100N
R27 10K
X3-1 X3-2 X3-3 X3-4
n.c.
n.c.
CABINET
X4-1 X4-2 X4-3 X4-4
47K
volume control
X4-5 X4-6 X4-7
6.3MM JACK FOR HEADPHONE
D43 BYW56
L1 5uH
Y (27V)
C57 100n
C58 100n
L2 5uH
Z (earth)
D44 BYW56
R163 32E
R164 100K
R165 100K
C75 47M
C76 22M
D45 BZX84 C5V1
C77 100n
R166 100K
R167 100K
R168 100K
C78 47M
+13
+5
+2.5
V++ (27V)
GND (earth)
Y
R169 100K
X4-11 X4-10 X4-9 X4-8
2 B SWITCH
C NL BCD
1 D 10 POS.
4 I
A2
A0
+5V MDB
CH1 occ.
CH5 occ.
CH3 occ.
A1
CH2 occ.
CH4 occ.
CH6 occ.
314A-6 D47
314A-6 D51
314A-6 D49
314A-6 D46
314A-6 D50
314A-6 D48
D53 BAV70
BU6-15 BU6-14 BU6-13 BU6-12 BU6-11 BU6-10
BU6-8 BU6-7 BU6-6 BU6-5 BU6-4 BU6-3 BU6-2
MONITOR
common ground

POWER SUPPLY CONNECTIONS

IC32-8 CONNECTED TO V++.
IC32-4 AND IC131-8 CONNECTED TO GND.
IC31-16 CONNECTED TO +5.

3922 156 06560

FIG.6 CIRCUITDIAGRAM AUDIO PART OF UP/SWITCH BOARD



mic. limit
priority
Auto Free 5
Auto Free 4
Auto Free 3
Auto Free 2
Auto Free 1
Auto Free10
Auto Free 9
Auto Free 8
Auto Free 7
Auto Free 6
Y
+26.5
C5 100M
C1 100M
Z
GND
D33 BAT 85
D34 BAT-85
VBAT
R35 330E
R32 1K
A1
C2 47M
VSS
A
C33 100N
C34 100N
IC1 74HC4094
IC2 74HC4094
C2 EN3
SRG8
C1/→
1D
2D
3▽
1
15
3
2
4
5
6
7
14
13
12
11
9
10
n.c.
D3
D2
D16
D17
R3 1K
R2 1K
R16 1K
R17 1K
D18
D19
D20
D21
D22
D23
D24
D25
R18 1K
R19 1K
R20 1K
R21 1K
R22 1K
R23 1K
R24 1K
R25 1K
CLK1
STR1
Vdd (27V)
C3 47M
C4 68M
D38 BZX79 C6V2
7905UC IC5
R36 160E
R37 160E
R38 160E
VSS (21V)

see fig. 7-2

| POWER SUPPLY CONNECTIONS | Vdd | Vbat | Vss | GND' |
|---|---|---|---|---|
| IC1 | PIN 16 | | PIN 8 | |
| IC2 | PIN 16 | | PIN 8 | |
| IC3 | PIN 16 | | PIN 8 | |
| IC4 | PIN 16 | | PIN 8 | |
| IC5 | PIN 1 | | PIN 2 | |
| IC7 | | PIN 28 | PIN 14 | |
| IC8 | PIN 28 | | PIN 14 | |
| IC9 | PIN 16 | | PIN 8 | |
| IC10 | PIN 16 | | PIN 8 | |
| IC11 | PIN 16 | | PIN 8 | |
| IC12 | PIN 16 | | PIN 8 | |
| IC13 | PIN 14 | | PIN 7 | |
| IC14 | PIN 16 | | PIN 8 | |
| IC15 | PIN 14 | | PIN 7 | |
| IC16 | PIN 14 | | PIN 8 | |
| IC17 | PIN 16 | | PIN 8 | |
| IC18 | PIN 16 | | PIN 8 | |
| IC19 | PIN 14 | | PIN 7 | |
| IC20 | PIN 14 | | PIN 7 | |
| IC21 | | PIN 14 | PIN 7 | |
| IC22 | PIN 16 | | PIN 8 | |
| IC23 | PIN 11 | | PIN 29 | |
| IC24 | PIN 16 | | PIN 8 | |
| IC25 | PIN 16 | | PIN 8 | |
| IC26 | PIN 20 | | PIN 10 | |
| IC27 | PIN 26 | | PIN 4 | |
| IC28 | PIN 16 | | PIN 15 | |
| IC29 | PIN 16 | | PIN 8 | |
| IC30 | PIN 16 | | PIN 8 | |
| IC101 | PIN 4 | | | PIN 11 |
| IC102 | PIN 4 | | | PIN 11 |
| IC103 | PIN 4 | | | PIN 11 |

see fig. 7-3

FIG. 7-1 CIRCUIT DIAGRAM UP- AND I/O /SWITCH PART OF UP/ SWITCH BOARD

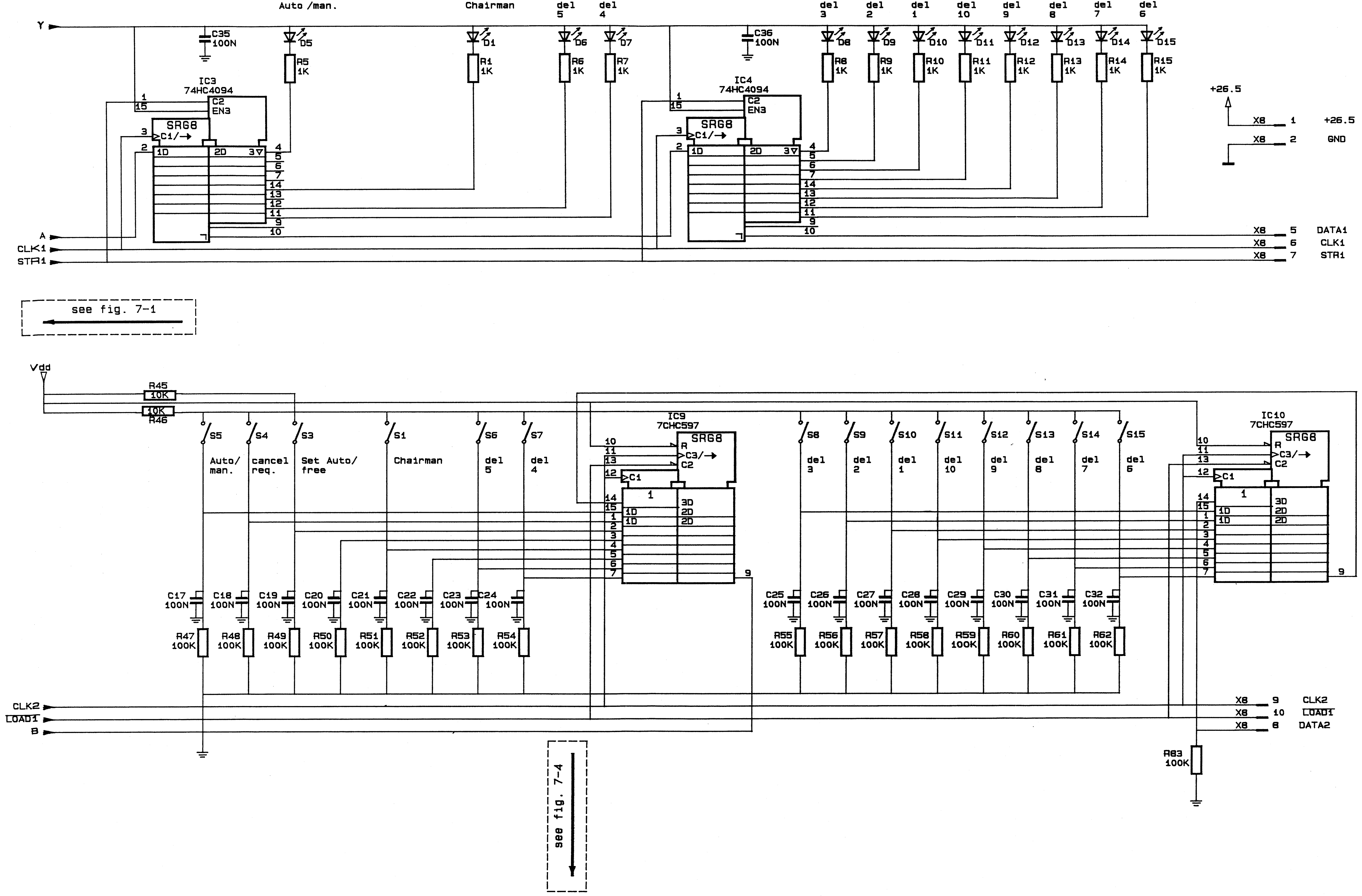
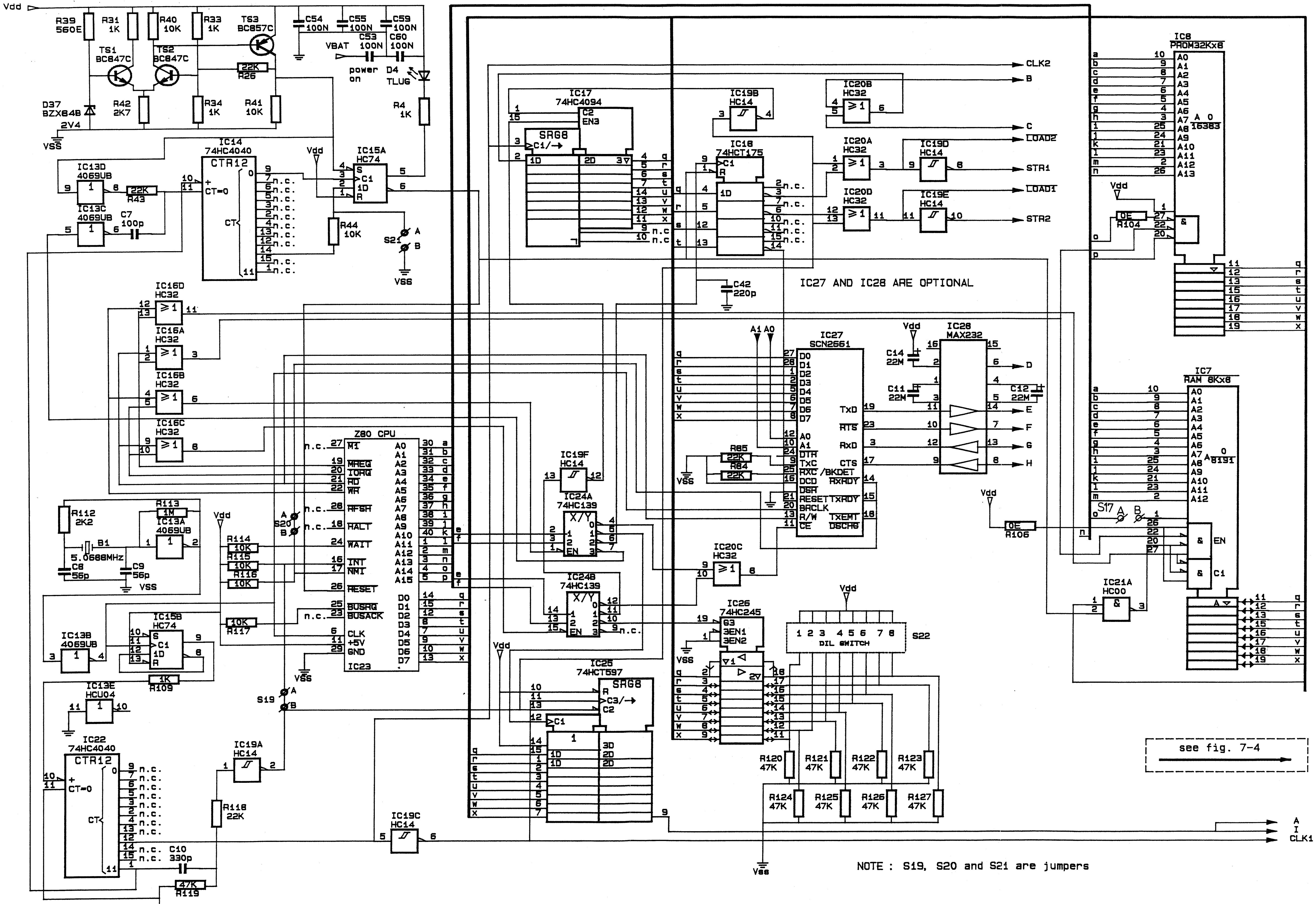

Auto /man.
Chairman
del 5
del 4
del 3
del 2
del 1
del 10
del 9
del 8
del 7
del 6
Y
C35 100N
C36 100N
D5
D1
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
R5 1K
R1 1K
R6 1K
R7 1K
R8 1K
R9 1K
R10 1K
R11 1K
R12 1K
R13 1K
R14 1K
R15 1K
IC3 74HC4094
IC4 74HC4094
SRG8
C2 EN3
C1/→
1D
2D
3▽
A
CLK1
STR1
+26.5
X8 1 +26.5
X8 2 GND
X8 5 DATA1
X8 6 CLK1
X8 7 STR1
see fig. 7-1
Vdd
R45 10K
R46 10K
S5 Auto/ man.
S4 cancel req.
S3 Set Auto/ free
S1 Chairman
S6 del 5
S7 del 4
S8 del 3
S9 del 2
S10 del 1
S11 del 10
S12 del 9
S13 del 8
S14 del 7
S15 del 6
IC9 7CHC597
IC10 7CHC597
SRG8
R
C3/→
C2
C1
3D
2D
1D
C17 100N
C18 100N
C19 100N
C20 100N
C21 100N
C22 100N
C23 100N
C24 100N
C25 100N
C26 100N
C27 100N
C28 100N
C29 100N
C30 100N
C31 100N
C32 100N
R47 100K
R48 100K
R49 100K
R50 100K
R51 100K
R52 100K
R53 100K
R54 100K
R55 100K
R56 100K
R57 100K
R58 100K
R59 100K
R60 100K
R61 100K
R62 100K
R83 100K
CLK2
LOAD1
B
X8 9 CLK2
X8 10 LOAD1
X8 8 DATA2
see fig. 7-4

FIG. 7-2 CIRCUIT DIAGRAM UP- AND I/O/SWITCH PART OF UP/SWITCH BOARD


Vdd
R39 560E
R31 1K
R40 10K
R33 1K
TS3 BC857C
C54 100N
C55 100N
C59 100N
TS1 BC847C
TS2 BC847C
VBAT
C53 100N
C60 100N
R26 22K
power on
D4 TLUG
D37 BZX84B 2V4
R42 2K7
R34 1K
R41 10K
R4 1K
VSS
IC14 74HC4040 CTR12
IC13D 4069UB
IC13C 4069UB
R43 22K
C7 100p
IC15A HC74
R44 10K
S21 A B
IC17 74HC4094 SRG8
IC18 74HCT175
IC19B HC14
IC20B HC32
IC20A HC32
IC19D HC14
IC20D HC32
IC19E HC14
CLK2
B
C
LOAD2
STR1
LOAD1
STR2
C42 220p
IC8 PROM32Kx8 A 0 16383
R104 0E
IC16D HC32
IC16A HC32
IC16B HC32
IC16C HC32
A1 A0
IC27 SCN2661
IC28 MAX232
C14 22M
C11 22M
C12 22M
R85 22K
R84 22K
D
E
F
G
H
IC7 RAM 8Kx8 A 0 8191
S17 A B
R106 0E
Z80 CPU IC23
S20 A B
R112 2K2
R113 1M
IC13A 4069UB
B1 5.0688MHz
C8 56p
C9 56p
R114 10K
R115 10K
R116 10K
R117 10K
IC19F HC14
IC24A 74HC139
IC24B 74HC139
IC20C HC32
IC26 74HC245
IC21A HC00
IC13B 4069UB
IC15B HC74
R109 1K
IC13E HCU04
S19 A B
IC22 74HC4040 CTR12
IC19A HC14
R118 22K
C10 330p
R119 47K
IC25 74HCT597 SRG8
IC19C HC14
S22 DIL SWITCH
R120 47K
R121 47K
R122 47K
R123 47K
R124 47K
R125 47K
R126 47K
R127 47K
A
I
CLK1
see fig. 7-4

IC27 AND IC28 ARE OPTIONAL

NOTE : S19, S20 and S21 are jumpers

FIG. 7-3 CIRCUIT DIAGRAM UP- AND I/O/SWITCH PART OF UP/SWITCH BOARD

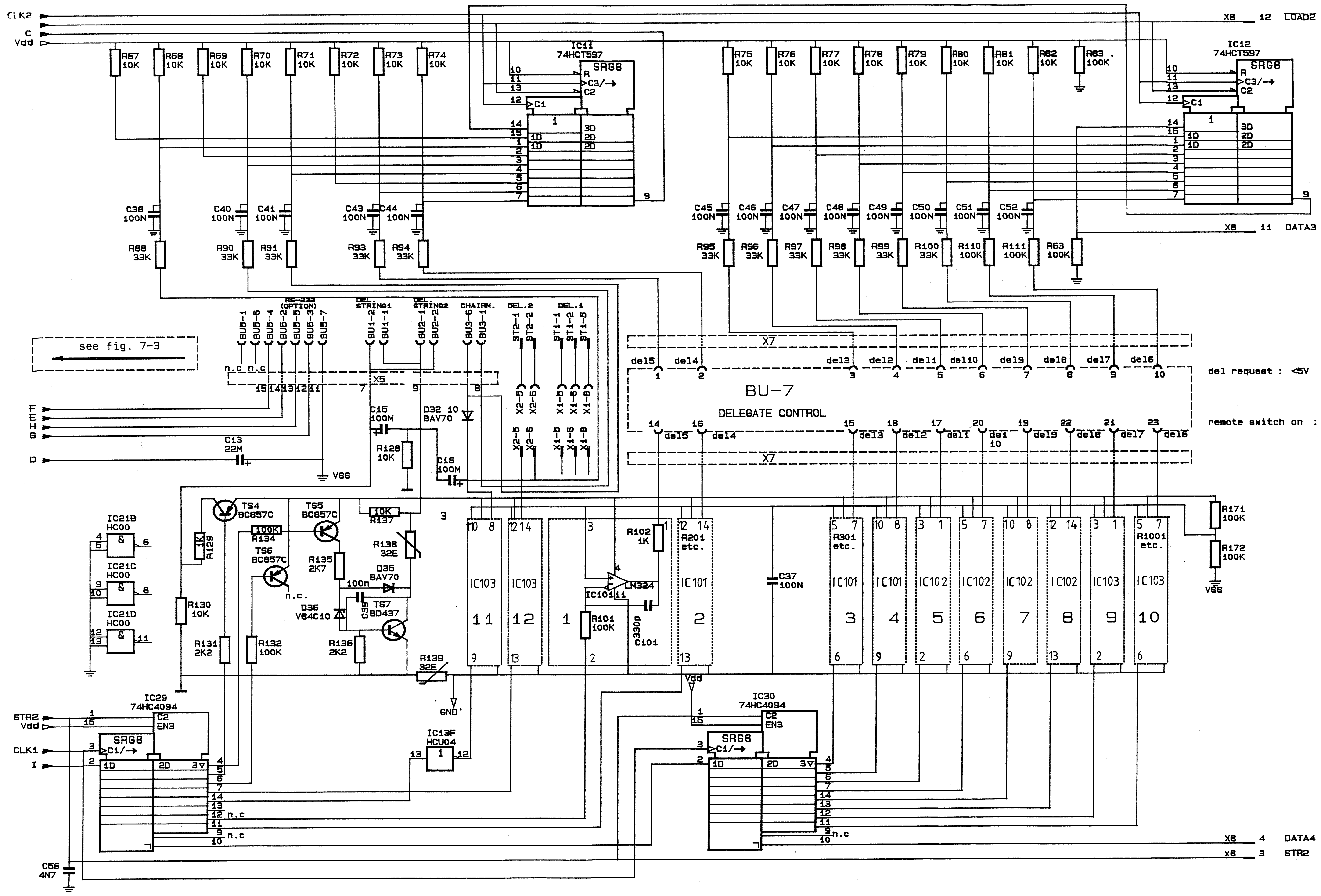

CLK2
C
Vdd
R67 10K
R68 10K
R69 10K
R70 10K
R71 10K
R72 10K
R73 10K
R74 10K
IC11 74HCT597
SRG8
R
C3/→
C2
C1
1D
3D
2D
C38 100N
C40 100N
C41 100N
C43 100N
C44 100N
R88 33K
R90 33K
R91 33K
R93 33K
R94 33K
R75 10K
R76 10K
R77 10K
R78 10K
R79 10K
R80 10K
R81 10K
R82 10K
R83 100K
IC12 74HCT597
C45 100N
C46 100N
C47 100N
C48 100N
C49 100N
C50 100N
C51 100N
C52 100N
R95 33K
R96 33K
R97 33K
R98 33K
R99 33K
R100 33K
R110 100K
R111 100K
R63 100K
X8 12 LOAD2
X8 11 DATA3
see fig. 7-3
RS-232 (OPTION)
BU5-1
BU5-6
BU5-4
BU5-2
BU5-5
BU5-3
BU5-7
DEL. STRING1
BU1-2
BU1-1
DEL. STRING2
BU2-1
BU2-2
CHAIRM.
BU3-6
BU3-1
DEL.2
ST2-1
ST2-2
DEL.1
ST1-1
ST1-2
ST1-5
n.c
X5
X2-5
X2-6
X1-5
X1-6
X1-8
X7
del5
del4
del3
del2
del1
del10
del9
del8
del7
del6
BU-7
DELEGATE CONTROL
del request : <5V
remote switch on : >
F
E
H
G
D
C13 22M
VSS
C15 100M
R128 10K
D32 10 BAV70
C16 100M
TS4 BC857C
TS5 BC857C
TS6 BC857C
R129 1K
R134 100K
R137 10K
R138 32E
R135 2K7
D35 BAV70
100n
D36 V84C10
C39
TS7 BD437
R130 10K
R131 2K2
R132 100K
R136 2K2
R139 32E
n.c.
GND'
IC21B HC00
IC21C HC00
IC21D HC00
&
IC103
IC101
IC102
R102 1K
R201 etc.
R301 etc.
R1001 etc.
LM324
IC101
R101 100K
330p C101
C37 100N
R171 100K
R172 100K
VSS
Vdd
IC29 74HC4094
STR2
Vdd
CLK1
I
EN3
C1/→
3▽
n.c
C56 4N7
IC13F HCU04
IC30 74HC4094
X8 4 DATA4
x8 3 STR2

FIG. 7-4 CIRCUIT DIAGRAM UP- AND I/O/SWITCH PART OF UP/SWITCH BOARD

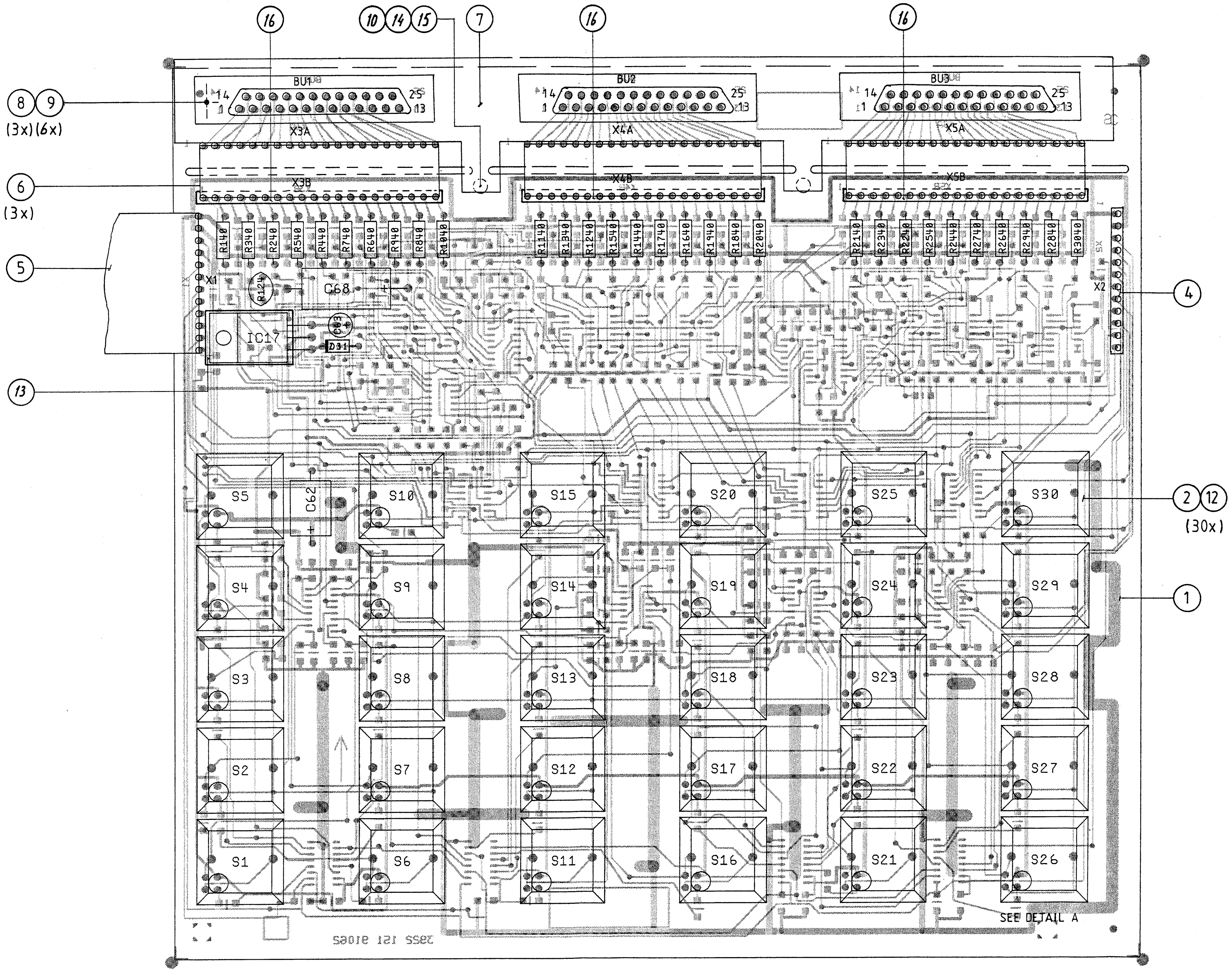

16
10 14 15
7
16
16
8 9
(3x) (6x)
6
(3x)
5
4
13
2 12
(30x)
1
BU1
BU2
BU3
X3A
X4A
X5A
X3B
X4B
X5B
X1
X2
IC17
C68
C62
D31
R140
R340
R240
R540
R440
R740
R640
R940
R840
R1040
R1140
R1340
R1240
R1540
R1440
R1740
R1640
R1940
R1840
R2040
R2140
R2340
R2240
R2540
R2440
R2740
R2640
R2940
R2840
R3040
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18
S19
S20
S21
S22
S23
S24
S25
S26
S27
S28
S29
S30
SEE DETAIL A

FIG. 8-1 ASSEMBLY DIAGRAM OF I/O/SWITCH BOARD, TOP SIDE

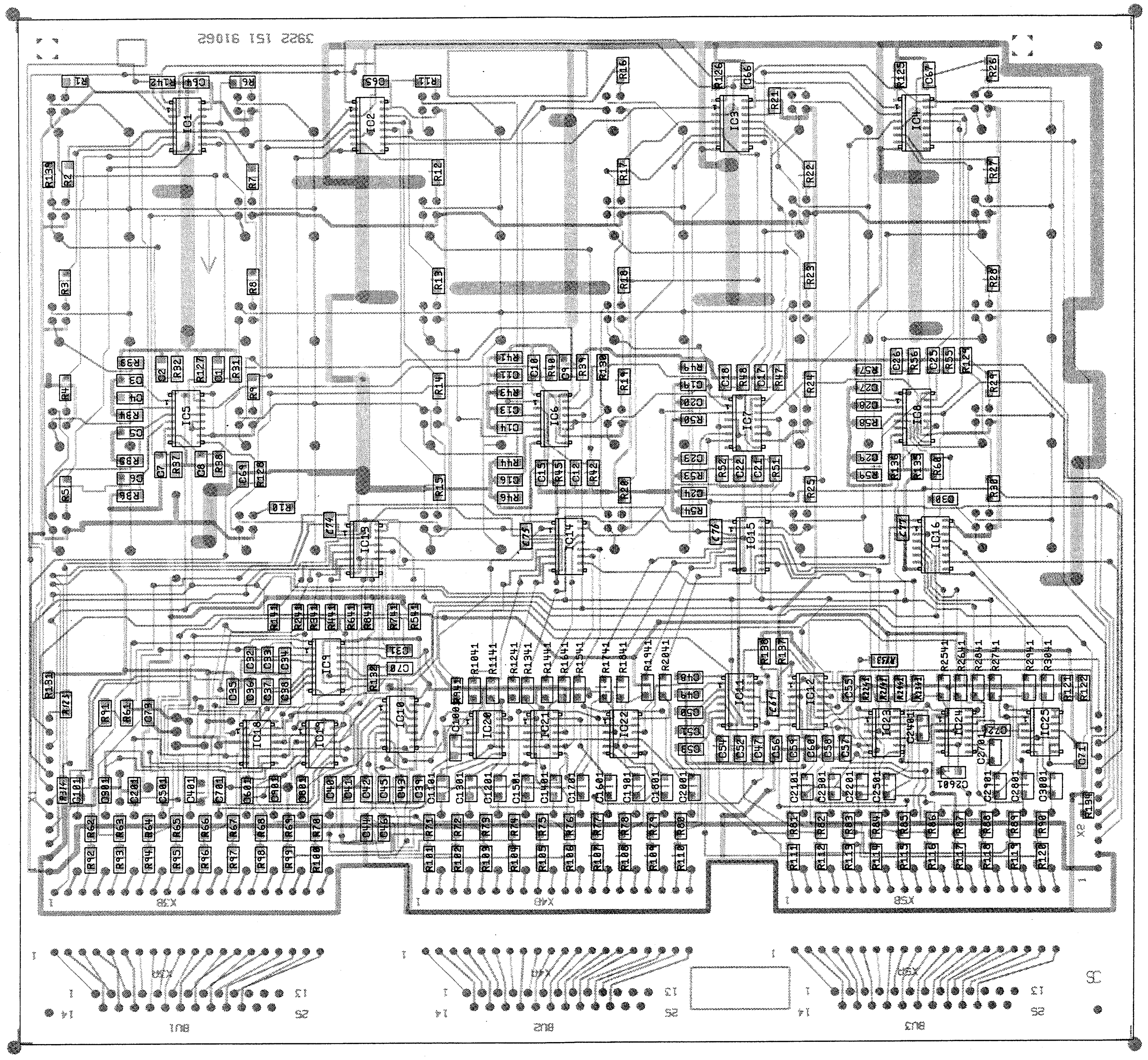
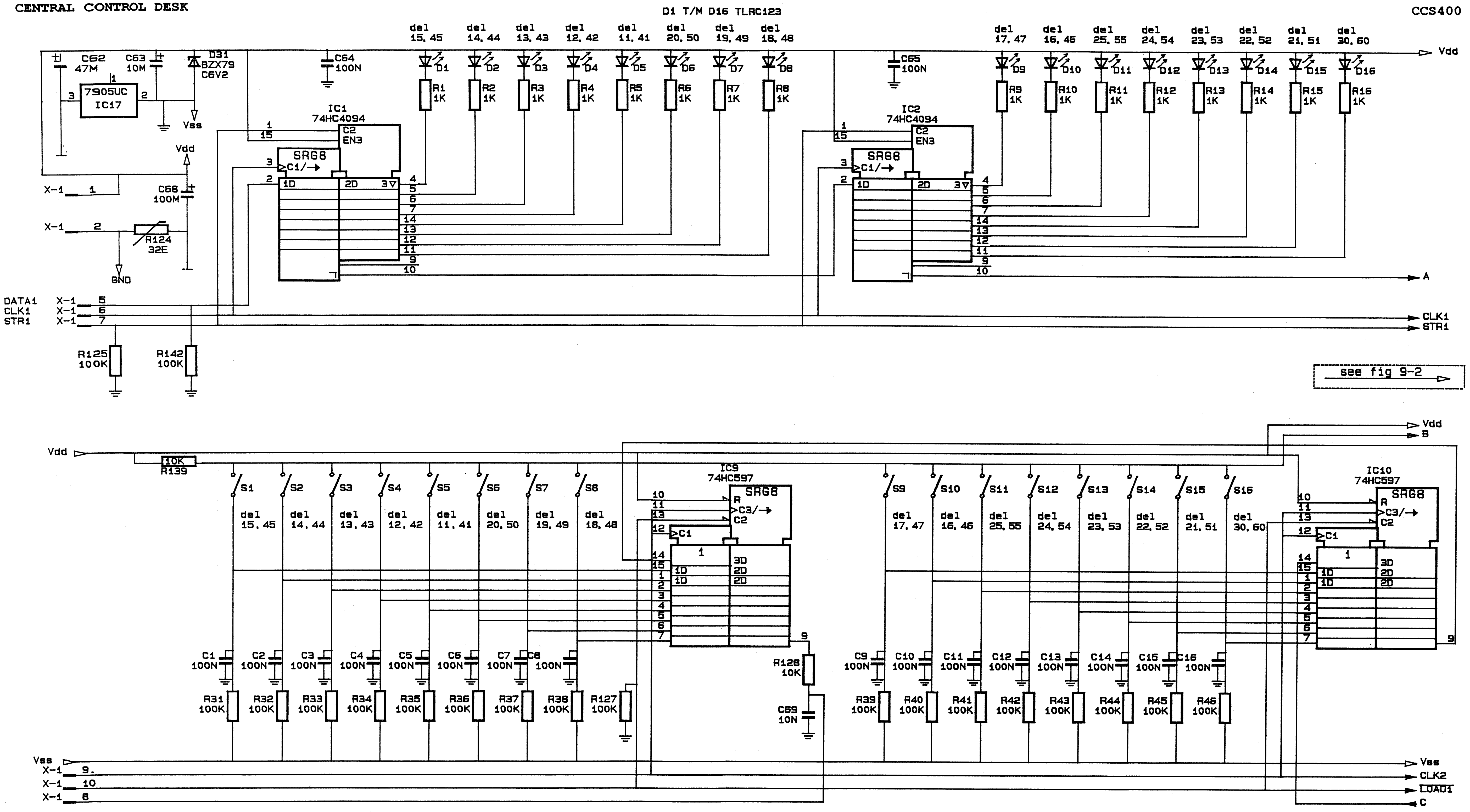


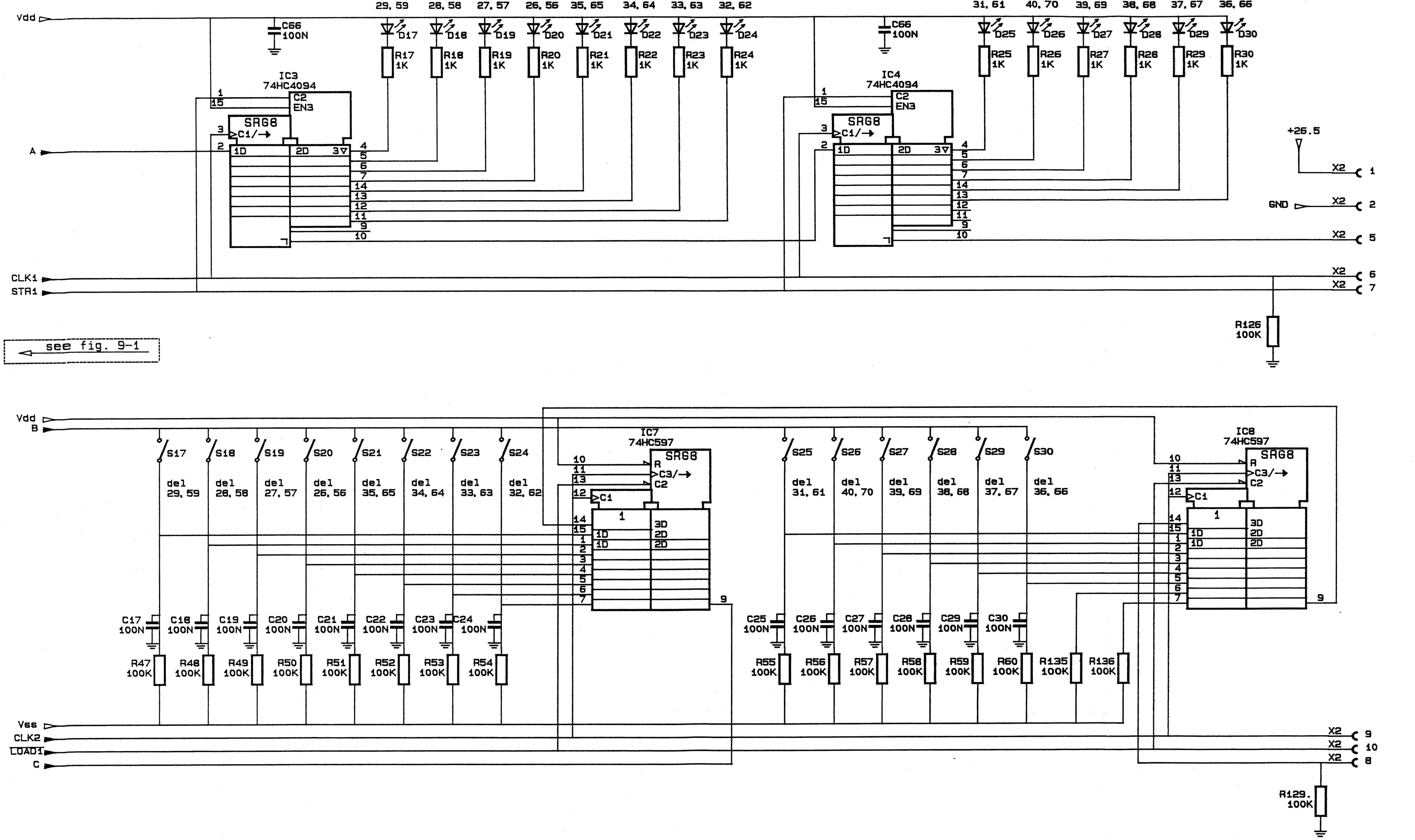
FIG. 8-2 ASSEMBLY DIAGRAM OF I/O/SWITCH BOARD, BOTTOM SIDE


D1 T/M D16 TLRC123
C62 47M
C63 10M
D31 BZX79 C6V2
7905UC IC17
Vss
Vdd
C64 100N
C65 100N
IC1 74HC4094
IC2 74HC4094
SRG8
C2
EN3
C1/→
1D
2D
3▽
C68 100M
R124 32E
GND
X-1
DATA1
CLK1
STR1
R125 100K
R142 100K
del 15, 45
del 14, 44
del 13, 43
del 12, 42
del 11, 41
del 20, 50
del 19, 49
del 18, 48
del 17, 47
del 16, 46
del 25, 55
del 24, 54
del 23, 53
del 22, 52
del 21, 51
del 30, 60
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
R1 1K
R2 1K
R3 1K
R4 1K
R5 1K
R6 1K
R7 1K
R8 1K
R9 1K
R10 1K
R11 1K
R12 1K
R13 1K
R14 1K
R15 1K
R16 1K
A
CLK1
STR1
see fig 9-2
Vdd
B
R139 10K
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
IC9 74HC597
IC10 74HC597
R
C3/→
C2
C1
3D
2D
1D
C1 100N
C2 100N
C3 100N
C4 100N
C5 100N
C6 100N
C7 100N
C8 100N
C9 100N
C10 100N
C11 100N
C12 100N
C13 100N
C14 100N
C15 100N
C16 100N
R31 100K
R32 100K
R33 100K
R34 100K
R35 100K
R36 100K
R37 100K
R38 100K
R127 100K
R128 10K
C69 10N
R39 100K
R40 100K
R41 100K
R42 100K
R43 100K
R44 100K
R45 100K
R46 100K
Vss
CLK2
LOAD1
C

## POWER SUPPLY CONNECTIONS

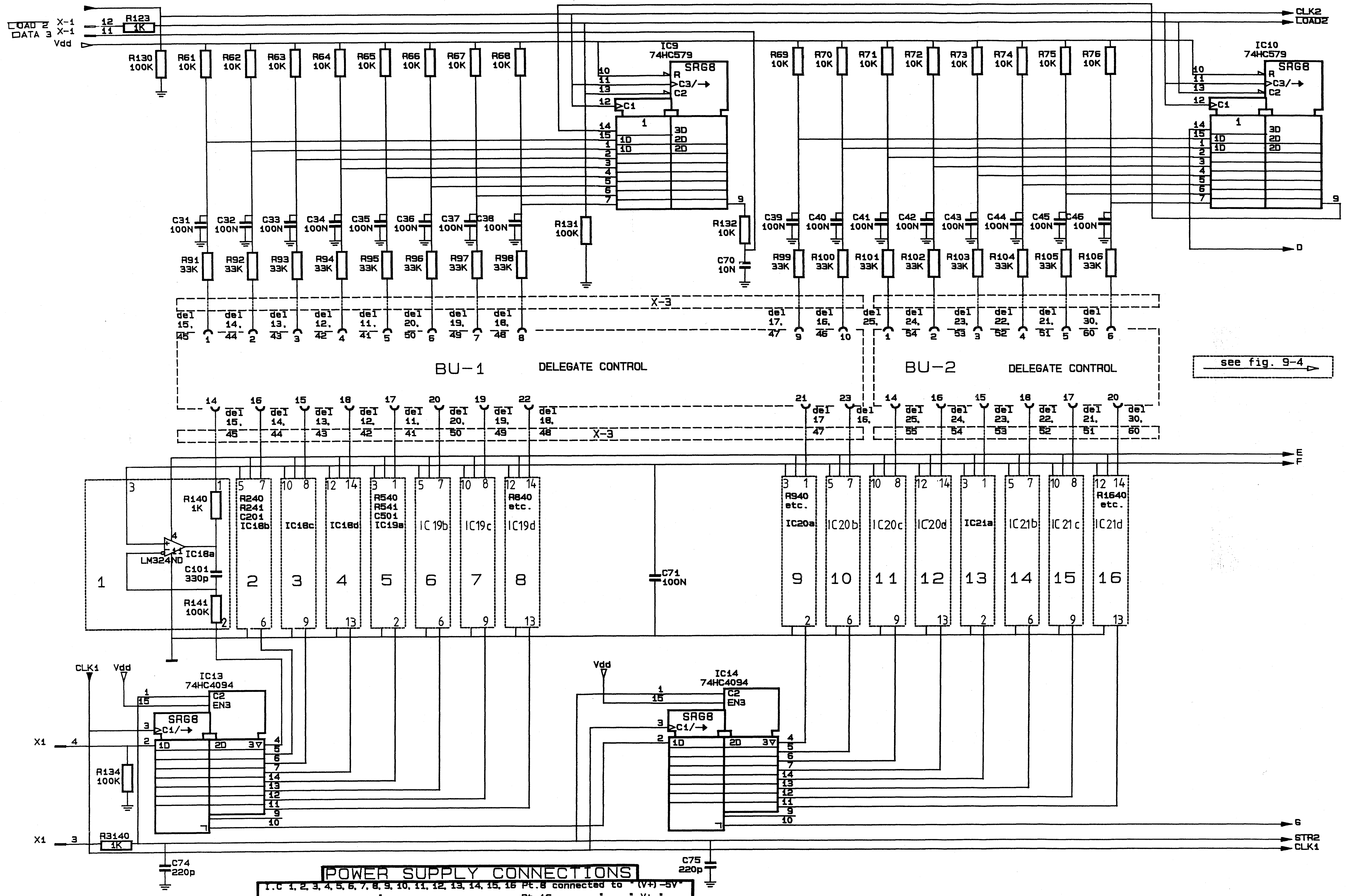
| | | | |
|---|---|---|---|
| I.C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | Pt.8 | connected to | "(V+) -5V" |
| " | Pt.16 | " | " V+ " |
| I.C 18, 19, 20, 21, 22, 23, 24, 25 | Pt.4 | " | " V+ " |
| " | Pt.11 | " | " ⊥ " |

FIG. 9-1 CIRCUIT DIAGRAM OF I/O/SWITCH BOARD


Vdd
A
CLK1
STR1
see fig. 9-1
C66
100N
IC3
74HC4094
IC4
74HC4094
C2
EN3
SRG8
C1/→
1D
2D
3▽
del 29, 59
del 28, 58
del 27, 57
del 26, 56
del 35, 65
del 34, 64
del 33, 63
del 32, 62
del 31, 61
del 40, 70
del 39, 69
del 38, 68
del 37, 67
del 36, 66
D17
D18
D19
D20
D21
D22
D23
D24
D25
D26
D27
D28
D29
D30
R17 1K
R18 1K
R19 1K
R20 1K
R21 1K
R22 1K
R23 1K
R24 1K
R25 1K
R26 1K
R27 1K
R28 1K
R29 1K
R30 1K
+26.5
GND
X2
R126 100K
Vdd
B
S17
S18
S19
S20
S21
S22
S23
S24
S25
S26
S27
S28
S29
S30
IC7
74HC597
IC8
74HC597
SRG8
R
C3/→
C2
C1
3D
2D
C17 100N
C18 100N
C19 100N
C20 100N
C21 100N
C22 100N
C23 100N
C24 100N
C25 100N
C26 100N
C27 100N
C28 100N
C29 100N
C30 100N
R47 100K
R48 100K
R49 100K
R50 100K
R51 100K
R52 100K
R53 100K
R54 100K
R55 100K
R56 100K
R57 100K
R58 100K
R59 100K
R60 100K
R135 100K
R136 100K
Vss
CLK2
LOAD1
C
R129. 100K

| POWER SUPPLY CONNECTIONS | | | |
|---|---|---|---|
| I.C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | Pt.8 | connected to | "(V+) -5V" |
| " | Pt.16 | " | " V+ " |
| I.C 18, 19, 20, 21, 22, 23, 24, 25 | Pt.4 | " | " V+ " |
| " | Pt.11 | " | " ⊥ " |

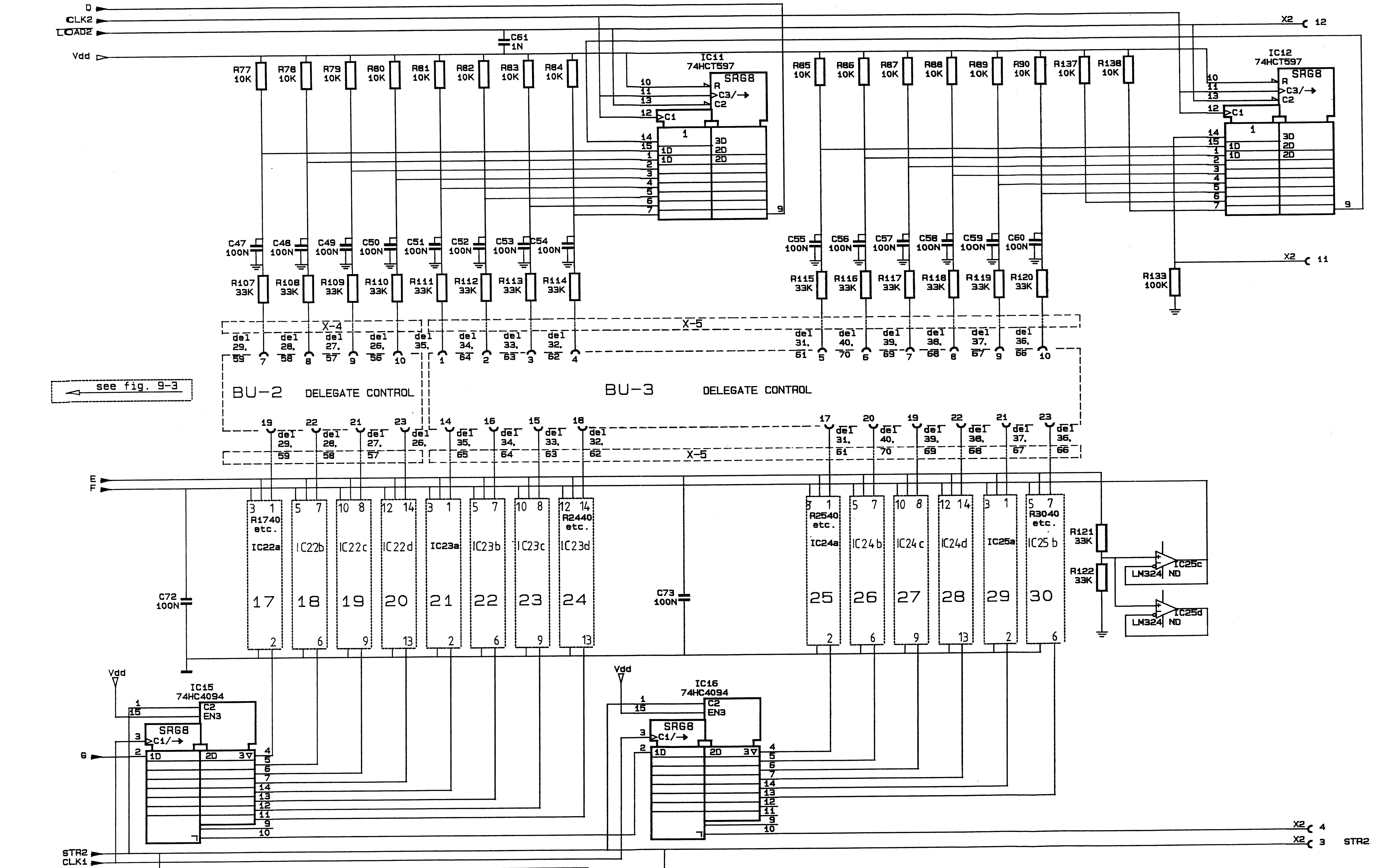
FIG. 9-2 CIRCUIT DIAGRAM OF I/O/SWITCH BOARD


LOAD 2 X-1 12
DATA 3 X-1 11
Vdd
R123 1K
R130 100K
R61 10K
R62 10K
R63 10K
R64 10K
R65 10K
R66 10K
R67 10K
R68 10K
IC9 74HC579
SRG8
R
C3/→
C2
C1
1D
3D
2D
R131 100K
R132 10K
C70 10N
R69 10K
R70 10K
R71 10K
R72 10K
R73 10K
R74 10K
R75 10K
R76 10K
IC10 74HC579
CLK2
LOAD2
D
C31 100N
C32 100N
C33 100N
C34 100N
C35 100N
C36 100N
C37 100N
C38 100N
C39 100N
C40 100N
C41 100N
C42 100N
C43 100N
C44 100N
C45 100N
C46 100N
R91 33K
R92 33K
R93 33K
R94 33K
R95 33K
R96 33K
R97 33K
R98 33K
R99 33K
R100 33K
R101 33K
R102 33K
R103 33K
R104 33K
R105 33K
R106 33K
X-3
del 15. 45
del 14. 44
del 13. 43
del 12. 42
del 11. 41
del 20. 50
del 19. 49
del 18. 48
del 17. 47
del 16. 46
del 25.
del 24. 54
del 23. 53
del 22. 52
del 21. 51
del 30. 60
BU-1
DELEGATE CONTROL
BU-2
DELEGATE CONTROL
see fig. 9-4
E
F
R140 1K
LM324ND
IC18a
C101 330p
R141 100K
R240 R241 C201 IC18b
IC18c
IC18d
R540 R541 C501 IC19a
IC 19b
IC19c
R840 etc. IC19d
C71 100N
R940 etc. IC20a
IC20b
IC20c
IC20d
IC21a
IC21b
IC 21c
R1640 etc. IC21d
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
CLK1
Vdd
IC13 74HC4094
C2
EN3
SRG8
C1/→
1D
2D
3▽
X1 4
R134 100K
X1 3
R3140 1K
C74 220p
IC14 74HC4094
C75 220p
G
STR2
CLK1

POWER SUPPLY CONNECTIONS

| | | | |
|---|---|---|---|
| I.C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | Pt.8 | connected to | "(V+) −5V" |
| " | Pt.16 | " | " V+ " |
| I.C 18, 19, 20, 21, 22, 23, 24, 25 | Pt.4 | " | " V+ " |
| " | Pt.11 | " | " ⊥ " |

FIG. 9-3 CIRCUIT DIAGRAM OF I/O/SWITCH BOARD


D
CLK2
LOAD2
Vdd
C61 1N
R77 10K
R78 10K
R79 10K
R80 10K
R81 10K
R82 10K
R83 10K
R84 10K
IC11 74HCT597
SRG8
R
C3/→
C2
C1
1D
2D
3D
R85 10K
R86 10K
R87 10K
R88 10K
R89 10K
R90 10K
R137 10K
R138 10K
IC12 74HCT597
X2 12
X2 11
R133 100K
C47 100N
C48 100N
C49 100N
C50 100N
C51 100N
C52 100N
C53 100N
C54 100N
C55 100N
C56 100N
C57 100N
C58 100N
C59 100N
C60 100N
R107 33K
R108 33K
R109 33K
R110 33K
R111 33K
R112 33K
R113 33K
R114 33K
R115 33K
R116 33K
R117 33K
R118 33K
R119 33K
R120 33K
X-4
X-5
del
see fig. 9-3
BU-2 DELEGATE CONTROL
BU-3 DELEGATE CONTROL
E
F
R1740 etc.
R2440 etc.
R2540 etc.
R3040 etc.
IC22a
IC22b
IC22c
IC22d
IC23a
IC23b
IC23c
IC23d
IC24a
IC24b
IC24c
IC24d
IC25a
IC25b
17
18
19
20
21
22
23
24
25
26
27
28
29
30
C72 100N
C73 100N
R121 33K
R122 33K
LM324 ND
IC25c
IC25d
Vdd
IC15 74HC4094
IC16 74HC4094
C2
EN3
SRG8
C1/→
6
STR2
CLK1
C76 220p
C77 220p
X2 4
X2 3
STR2

POWER SUPPLY CONNECTIONS

| | | | |
|---|---|---|---|
| I.C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | Pt.8 | connected to | "(V+) −5V" |
| " | Pt.16 | " | " V+ " |
| I.C 18, 19, 20, 21, 22, 23, 24, 25 | Pt.4 | " | " V+ " |
| " | Pt.11 | " | " ⊥ " |

FIG. 9-4 CIRCUIT DIAGRAM OF I/O/SWITCH BOARD

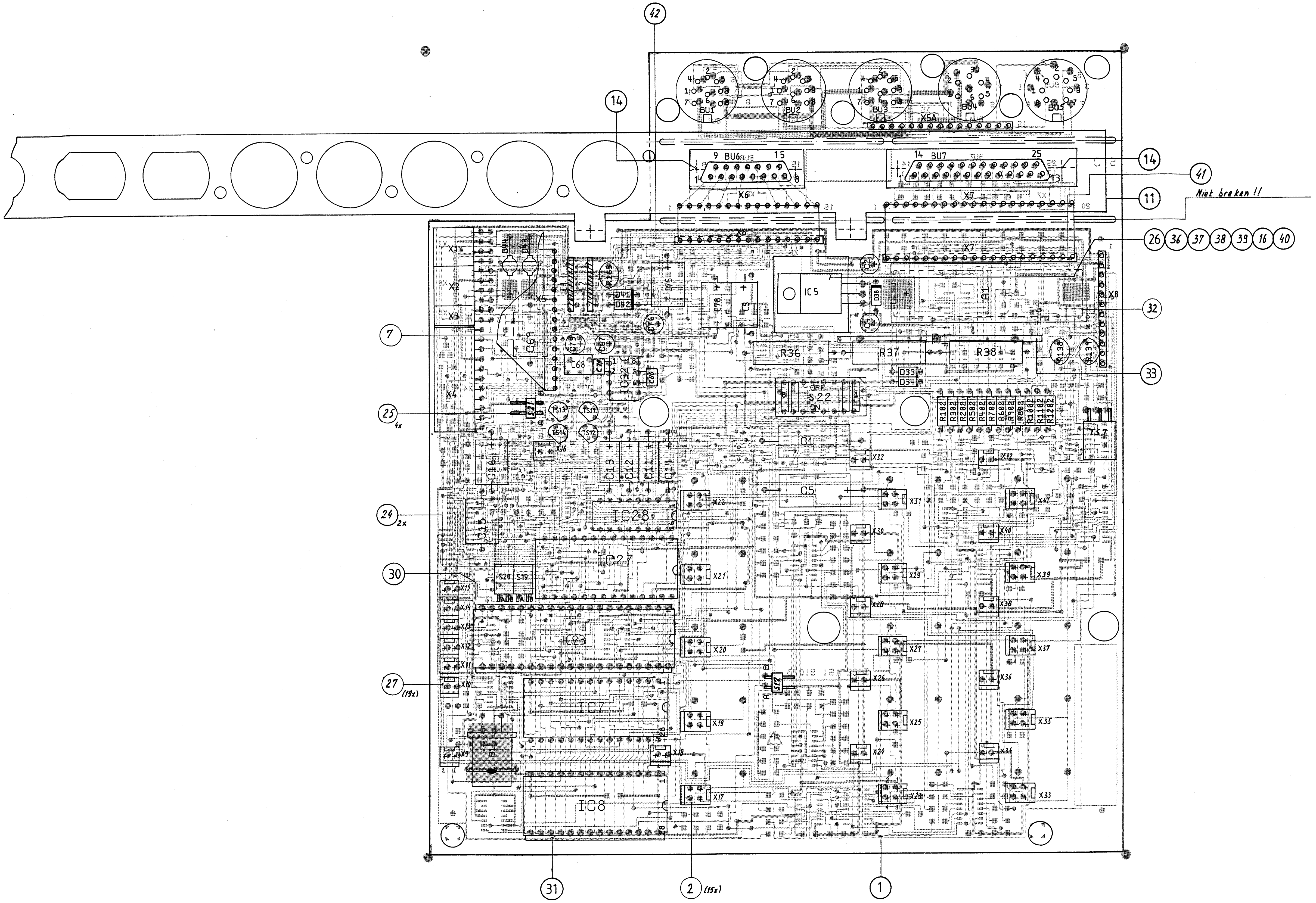

42
14
14
41
11
Niet breken !!
26
36
37
38
39
16
40
32
33
7
25
4x
24
2x
30
27
(19x)
31
2
(15x)
1
BU1
BU2
BU3
BU4
BU5
X5A
BU6
BU7
X6
X7
X1
X2
X3
X4
X5
X8
IC5
IC27
IC28
IC23
IC7
IC8
IC32
C1
C5
C11
C12
C13
C14
C15
C16
C68
C69
R36
R37
R38
S22
S19
S20
TS7
BL1

FIG. 10-1 ASSEMBLY DIAGRAM OF LBB 3386/01, TOP SIDE

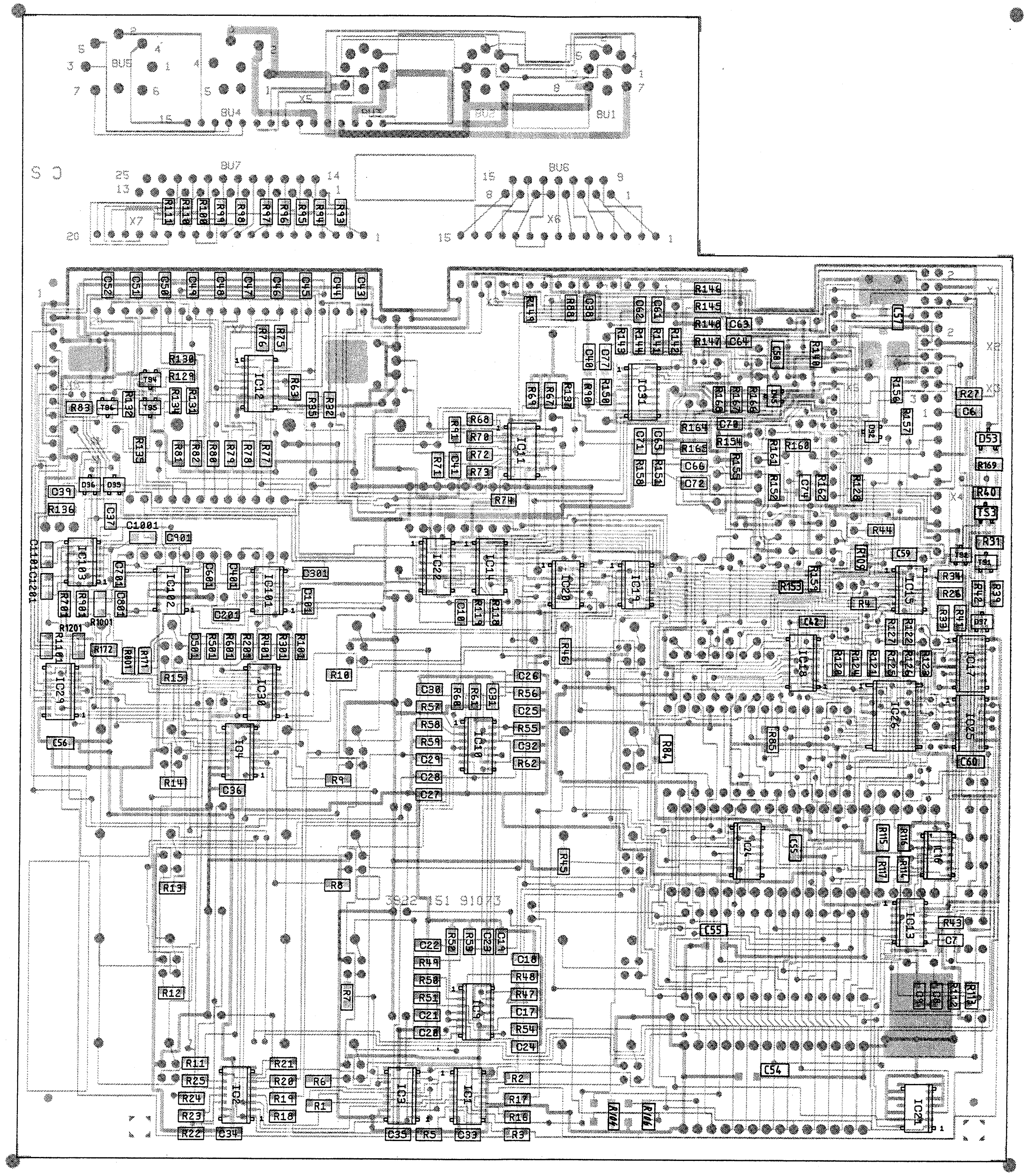
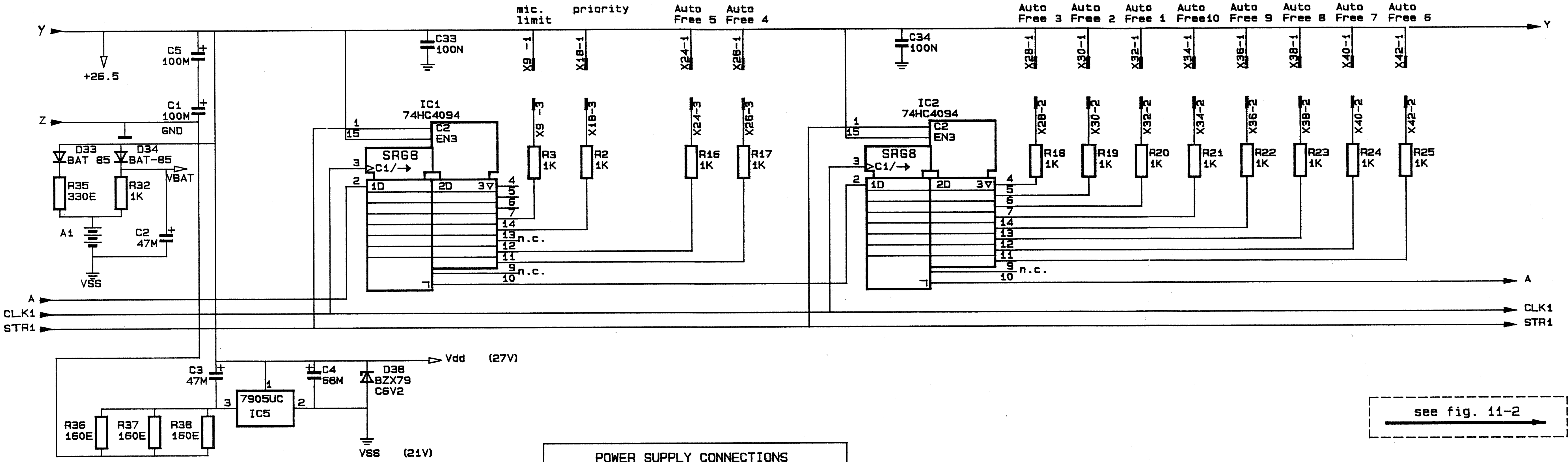


FIG. 10-2 ASSEMBLY DIAGRAM OF LBB 3386/01, BOTTOM SIDE

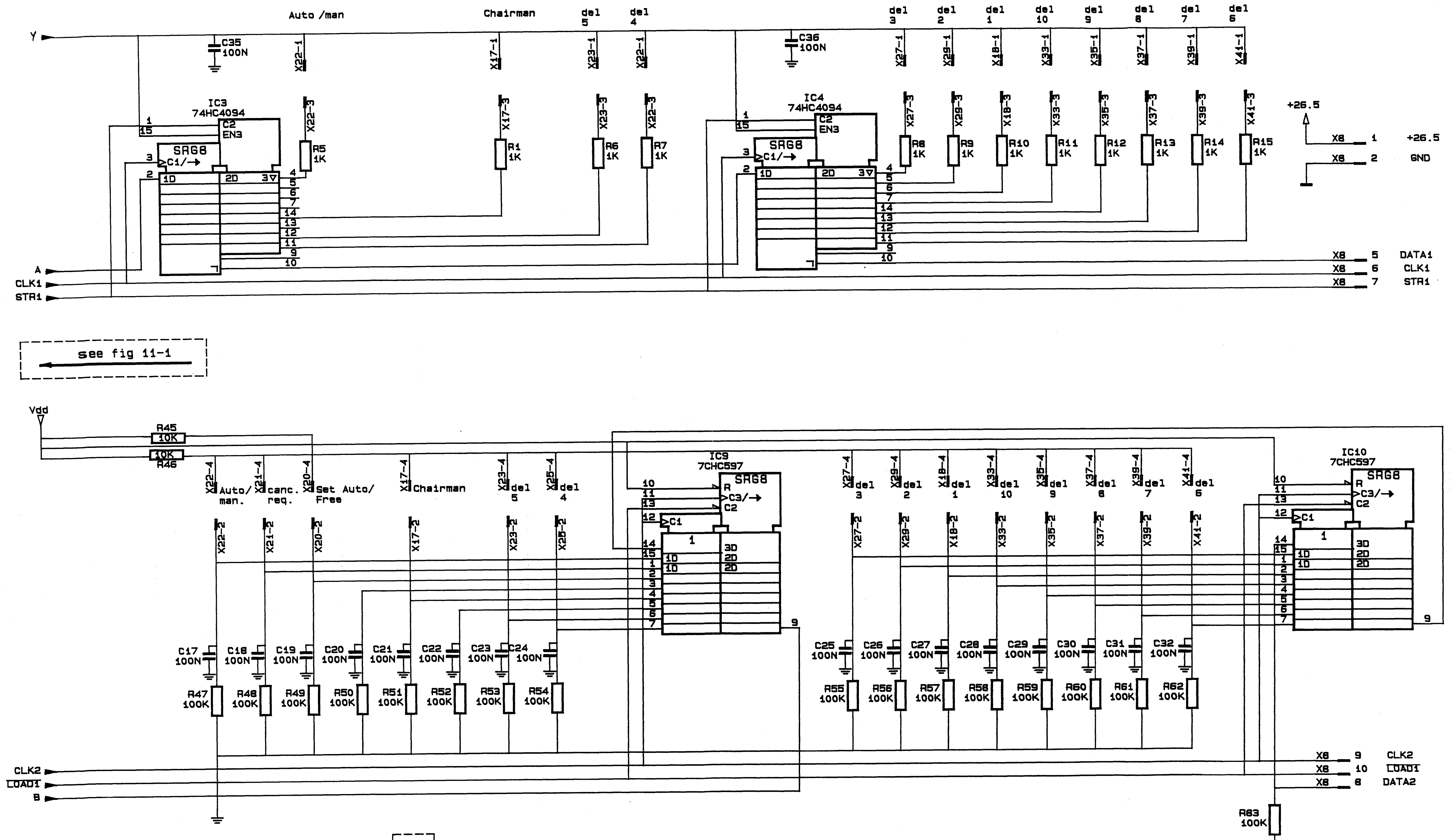

Y
+26.5
C5
100M
C1
100M
Z
GND
D33
BAT 85
D34
BAT-85
VBAT
R35
330E
R32
1K
A1
C2
47M
VSS
A
CLK1
STR1
C33
100N
mic.
limit
priority
Auto
Free 5
Auto
Free 4
X9 -1
X18-1
X24-1
X26-1
X9 -3
X18-3
X24-3
X26-3
IC1
74HC4094
C2
EN3
SRG8
C1/→
1D
2D
3▽
R3
1K
R2
1K
R16
1K
R17
1K
n.c.
n.c.
C34
100N
IC2
74HC4094
Auto
Free 3
Auto
Free 2
Auto
Free 1
Auto
Free10
Auto
Free 9
Auto
Free 8
Auto
Free 7
Auto
Free 6
X28-1
X30-1
X32-1
X34-1
X36-1
X38-1
X40-1
X42-1
X28-2
X30-2
X32-2
X34-2
X36-2
X38-2
X40-2
X42-2
R18
1K
R19
1K
R20
1K
R21
1K
R22
1K
R23
1K
R24
1K
R25
1K
Vdd (27V)
C3
47M
7905UC
IC5
C4
68M
D38
BZX79
C6V2
R36
160E
R37
160E
R38
160E
VSS (21V)

| POWER SUPPLY CONNECTIONS | | | | |
|---|---|---|---|---|
| | Vdd | Vbat | Vss | GND' |
| IC1 | PIN 16 | | PIN 8 | |
| IC2 | PIN 16 | | PIN 8 | |
| IC3 | PIN 16 | | PIN 8 | |
| IC4 | PIN 16 | | PIN 8 | |
| IC5 | PIN 1 | | PIN 2 | |
| IC7 | | PIN 28 | PIN 14 | |
| IC8 | PIN 28 | | PIN 14 | |
| IC9 | PIN 16 | | PIN 8 | |
| IC10 | PIN 16 | | PIN 8 | |
| IC11 | PIN 16 | | PIN 8 | |
| IC12 | PIN 16 | | PIN 8 | |
| IC13 | PIN 14 | | PIN 7 | |
| IC14 | PIN 16 | | PIN 8 | |
| IC15 | PIN 14 | | PIN 7 | |
| IC16 | PIN 14 | | PIN 8 | |
| IC17 | PIN 16 | | PIN 8 | |
| IC18 | PIN 16 | | PIN 8 | |
| IC19 | PIN 14 | | PIN 7 | |
| IC20 | PIN 14 | | PIN 7 | |
| IC21 | | PIN 14 | PIN 7 | |
| IC22 | PIN 16 | | PIN 8 | |
| IC23 | PIN 11 | | PIN 29 | |
| IC24 | PIN 16 | | PIN 8 | |
| IC25 | PIN 16 | | PIN 8 | |
| IC26 | PIN 20 | | PIN 10 | |
| IC27 | PIN 26 | | PIN 4 | |
| IC28 | PIN 16 | | PIN 15 | |
| IC29 | PIN 16 | | PIN 8 | |
| IC30 | PIN 16 | | PIN 8 | |
| IC101 | PIN 4 | | | PIN 11 |
| IC102 | PIN 4 | | | PIN 11 |
| IC103 | PIN 4 | | | PIN 11 |

see fig. 11-2 →

see fig. 11-3 ↓

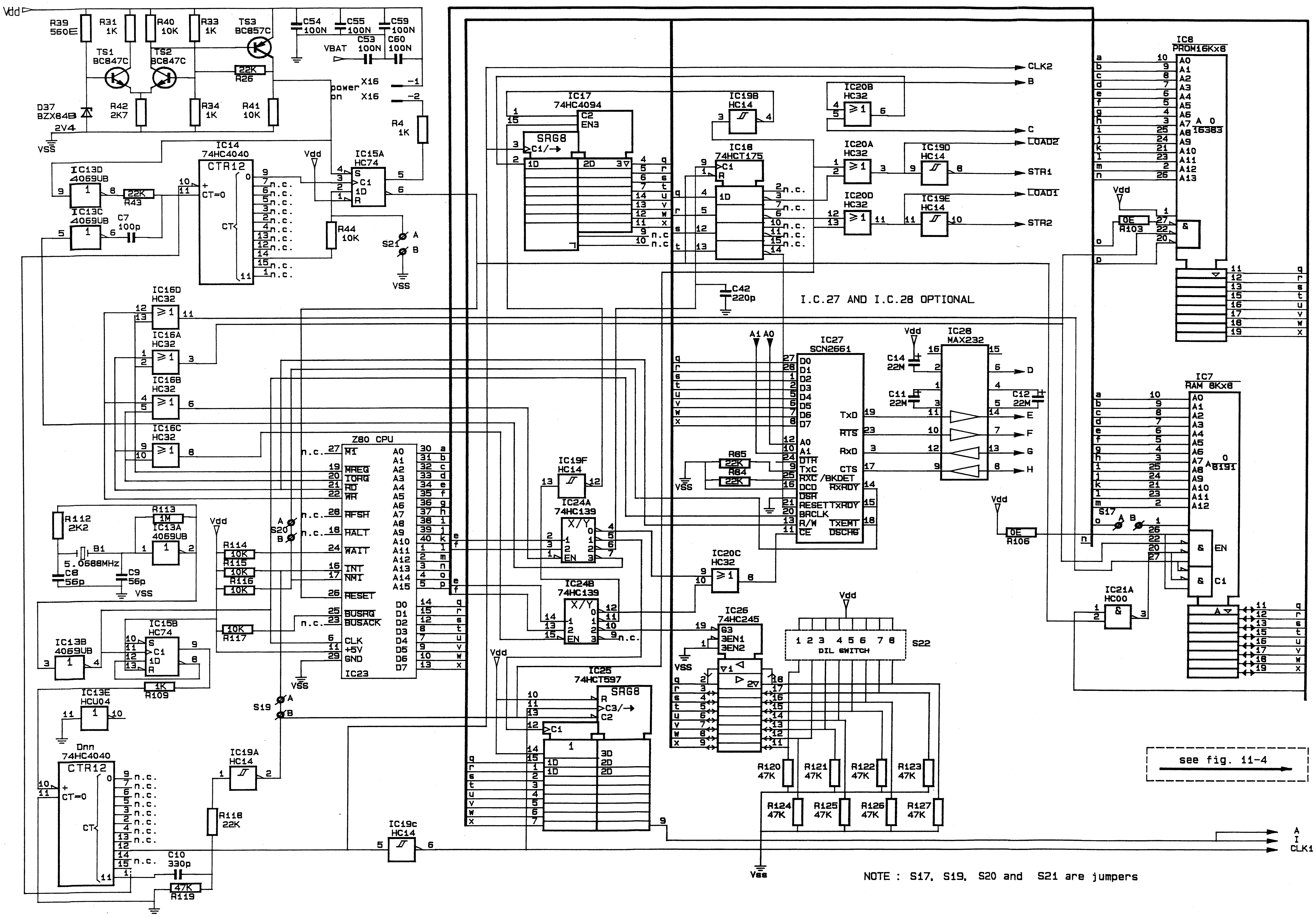
FIG. 11-1 CIRCUIT DIAGRAM OF LBB 3386/01


Y
A
CLK1
STR1
Auto /man
Chairman
del 5
del 4
del 3
del 2
del 1
del 10
del 9
del 8
del 7
del 6
C35 100N
C36 100N
X22-1
X17-1
X23-1
X27-1
X29-1
X18-1
X33-1
X35-1
X37-1
X39-1
X41-1
IC3 74HC4094
IC4 74HC4094
SRG8
C2
EN3
C1/→
1D
2D
3▽
X22-3
X17-3
X23-3
X27-3
X29-3
X18-3
X33-3
X35-3
X37-3
X39-3
X41-3
R5 1K
R1 1K
R6 1K
R7 1K
R8 1K
R9 1K
R10 1K
R11 1K
R12 1K
R13 1K
R14 1K
R15 1K
+26.5
X8 1 +26.5
X8 2 GND
X8 5 DATA1
X8 6 CLK1
X8 7 STR1
Vdd
R45 10K
R46 10K
X22-4 Auto/ man.
X21-4 canc. req.
X20-4 Set Auto/ Free
X17-4 Chairman
X23-4 del 5
X25-4 del 4
IC9 7CHC597
IC10 7CHC597
R
C3/→
C2
C1
3D
X22-2
X21-2
X20-2
X17-2
X23-2
X25-2
X27-4
X29-4
X18-4
X33-4
X35-4
X37-4
X39-4
X41-4
X27-2
X29-2
X18-2
X33-2
X35-2
X37-2
X39-2
X41-2
C17 100N
C18 100N
C19 100N
C20 100N
C21 100N
C22 100N
C23 100N
C24 100N
C25 100N
C26 100N
C27 100N
C28 100N
C29 100N
C30 100N
C31 100N
C32 100N
R47 100K
R48 100K
R49 100K
R50 100K
R51 100K
R52 100K
R53 100K
R54 100K
R55 100K
R56 100K
R57 100K
R58 100K
R59 100K
R60 100K
R61 100K
R62 100K
R83 100K
CLK2
LOAD1
B
X8 9 CLK2
X8 10 LOAD1
X8 8 DATA2

see fig 11-1

see fig 11-4

FIG. 11-2 CIRCUIT DIAGRAM OF LBB 3386/01


Vdd
R39 560E
R31 1K
R40 10K
R33 1K
TS3 BC857C
C54 100N
C55 100N
C59 100N
C53 100N
C60 100N
VBAT
TS1 BC847C
TS2 BC847C
R26 22K
power on
X16 -1
X16 -2
D37 BZX84B 2V4
R42 2K7
R34 1K
R41 10K
R4 1K
VSS
IC14 74HC4040 CTR12
IC13D 4069UB
IC13C 4069UB
R43 22K
C7 100p
IC15A HC74
R44 10K
S21 A B
IC17 74HC4094 SRG8
IC19B HC14
IC18 74HCT175
IC20B HC32
IC20A HC32
IC20D HC32
IC19D HC14
IC19E HC14
CLK2
B
C
LOAD2
STR1
LOAD1
STR2
C42 220p
I.C.27 AND I.C.28 OPTIONAL
IC8 PROM16Kx8
R103 0E
IC16D HC32
IC16A HC32
IC16B HC32
IC16C HC32
IC27 SCN2661
IC28 MAX232
C14 22M
C11 22M
C12 22M
R85 22K
R84 22K
TxD RTS RxD CTS
D E F G H
IC7 RAM 8Kx8
S17 A B
R106 0E
Z80 CPU IC23
M1 MREQ IORQ RD WR RFSH HALT WAIT INT NMI RESET BUSRQ BUSACK CLK +5V GND
R112 2K2
R113 1M
IC13A 4069UB
B1 5.0688MHz
C8 56p
C9 56p
S20 A B
R114 10K
R115 10K
R116 10K
R117 10K
IC19F HC14
IC24A 74HC139
IC24B 74HC139
IC20C HC32
IC21A HC00
IC13B 4069UB
IC15B HC74
R109 1K
IC13E HCU04
S19 A B
IC26 74HC245
S22 DIL SWITCH
IC25 74HCT597 SRG8
Dnn 74HC4040 CTR12
IC19A HC14
R118 22K
C10 330p
R119 47K
IC19C HC14
R120 47K
R121 47K
R122 47K
R123 47K
R124 47K
R125 47K
R126 47K
R127 47K
A I CLK1
see fig. 11-4

NOTE : S17, S19, S20 and S21 are jumpers

FIG. 11-3 CIRCUIT DIAGRAM OF LBB 3386/01

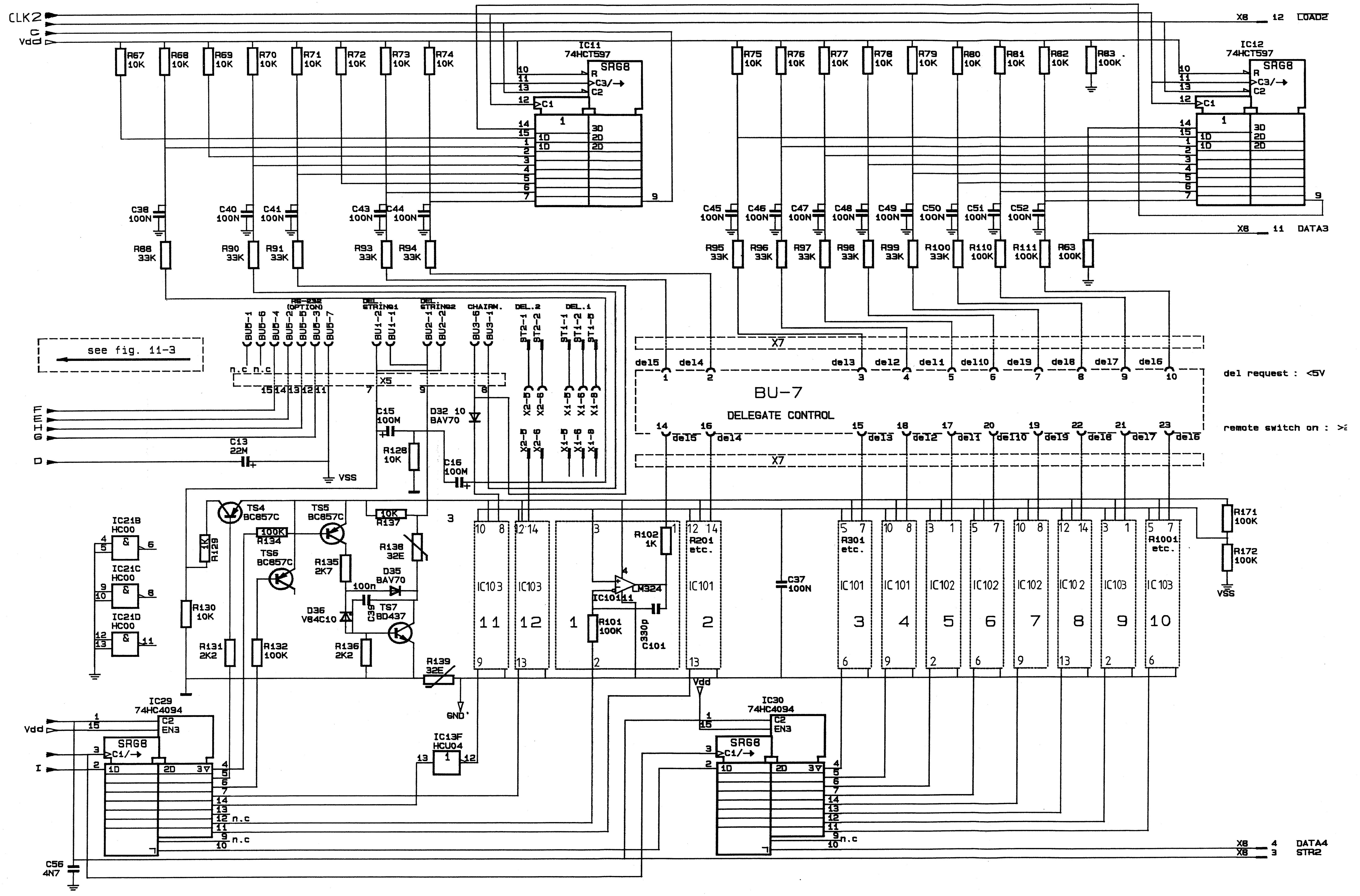

CLK2
C
Vdd
R67 10K
R68 10K
R69 10K
R70 10K
R71 10K
R72 10K
R73 10K
R74 10K
IC11
74HCT597
SRG8
R
C3/→
C2
C1
1D
2D
3D
10
11
12
13
14
15
1
2
3
4
5
6
7
9
C38 100N
C40 100N
C41 100N
C43 100N
C44 100N
R88 33K
R90 33K
R91 33K
R93 33K
R94 33K
R75 10K
R76 10K
R77 10K
R78 10K
R79 10K
R80 10K
R81 10K
R82 10K
R83 100K
IC12
74HCT597
X8 12 LOAD2
X8 11 DATA3
C45 100N
C46 100N
C47 100N
C48 100N
C49 100N
C50 100N
C51 100N
C52 100N
R95 33K
R96 33K
R97 33K
R98 33K
R99 33K
R100 33K
R110 100K
R111 100K
R63 100K
RS-232 (OPTION)
DEL. STRING1
DEL. STRING2
CHAIRM.
DEL.2
DEL.1
BU5-1
BU5-6
BU5-4
BU5-2
BU5-5
BU5-3
BU5-7
BU1-2
BU1-1
BU2-1
BU2-2
BU3-6
BU3-1
ST2-1
ST2-2
ST1-1
ST1-2
ST1-8
see fig. 11-3
n.c n.c
X5
X2-5
X2-6
X1-5
X1-6
X1-8
F
E
H
G
D
C13 22M
VSS
C15 100M
D32 10 BAV70
R128 10K
C16 100M
X7
del5
del4
del3
del2
del1
del10
del9
del8
del7
del6
BU-7
DELEGATE CONTROL
del request : <5V
remote switch on : >
IC21B HC00
IC21C HC00
IC21D HC00
&
TS4 BC857C
TS5 BC857C
TS6 BC857C
R129 1K
R134 100K
R137 10K
R138 32E
R135 2K7
D35 BAV70
100n
C39
D36 V84C10
TS7 BD437
R130 10K
R131 2K2
R132 100K
R136 2K2
R139 32E
GND'
3
IC103 11
IC103 12
1
IC101 2
IC101 3
IC101 4
IC102 5
IC102 6
IC102 7
IC102 8
IC103 9
IC103 10
R102 1K
R201 etc.
R301 etc.
R1001 etc.
LM324
IC101
R101 100K
330p C101
C37 100N
R171 100K
R172 100K
VSS
IC29
74HC4094
C2
EN3
SRG8
C1/→
n.c
Vdd
I
C56 4N7
IC13F HCU04
IC30
74HC4094
X8 4 DATA4
X8 3 STR2

FIG. 11-4 CIRCUIT DIAGRAM OF LBB 3386/01

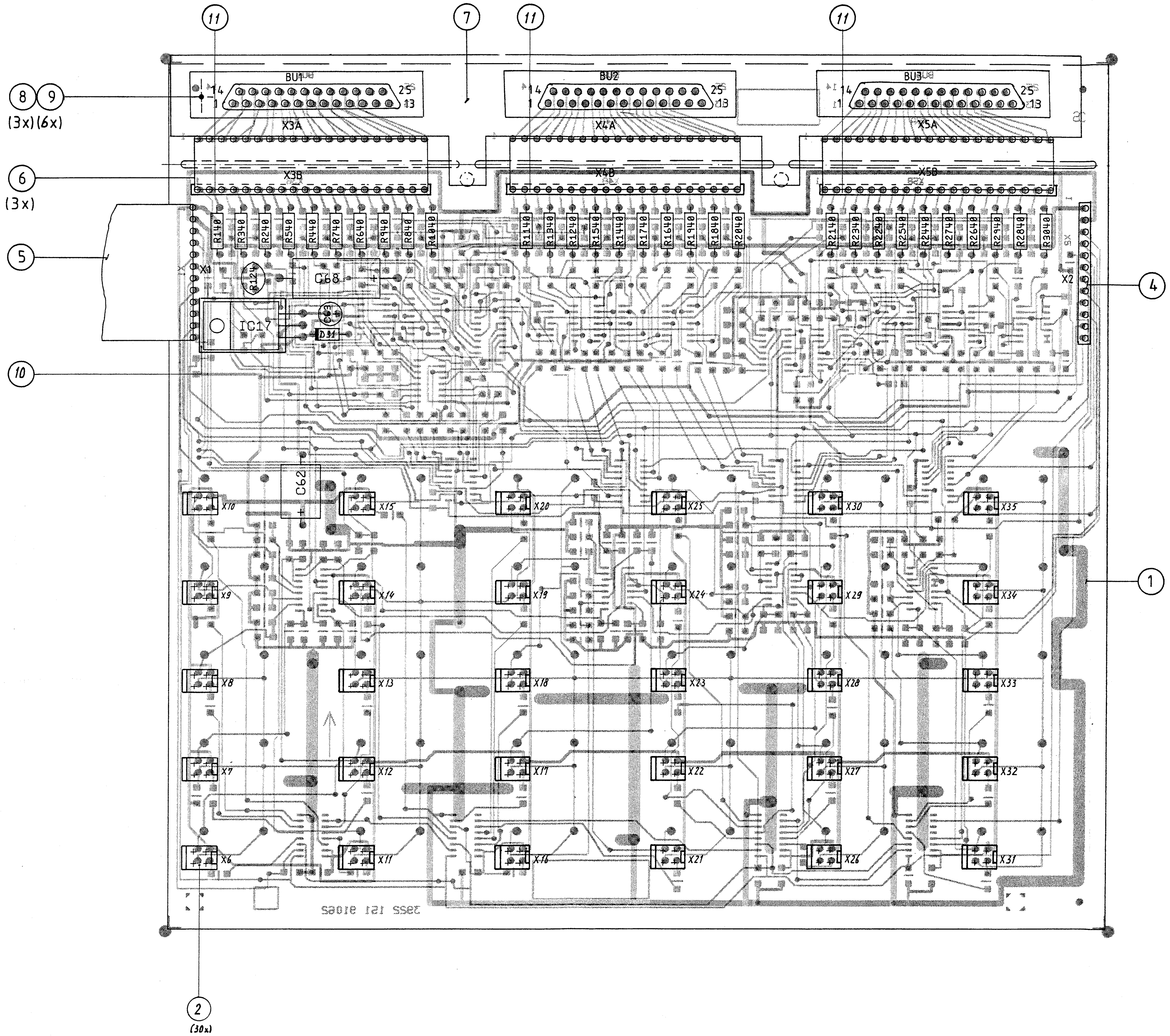

11
7
11
11
8
9
(3x) (6x)
6
(3x)
5
10
4
1
2
(30x)
BU1
BU2
BU3
14
25
1
13
X3A
X4A
X5A
X3B
X4B
X5B
X1
X2
IC17
C68
C62
D31
X6
X7
X8
X9
X10
X11
X12
X13
X14
X15
X16
X17
X18
X19
X20
X21
X22
X23
X24
X25
X26
X27
X28
X29
X30
X31
X32
X33
X34
X35

FIG. 12-1 ASSEMBLY DIAGRAM OF LBB 3386/02, TOP SIDE

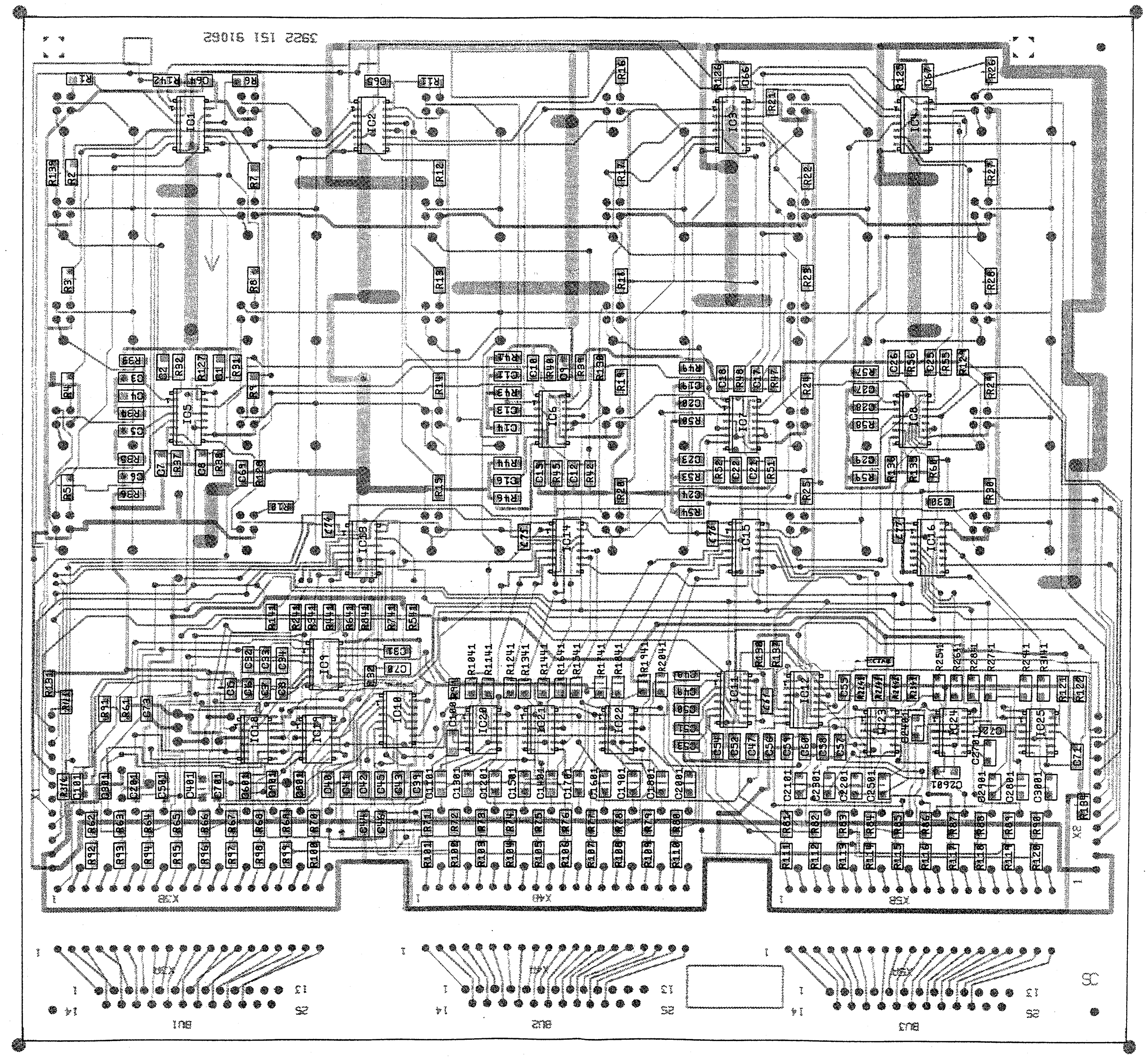
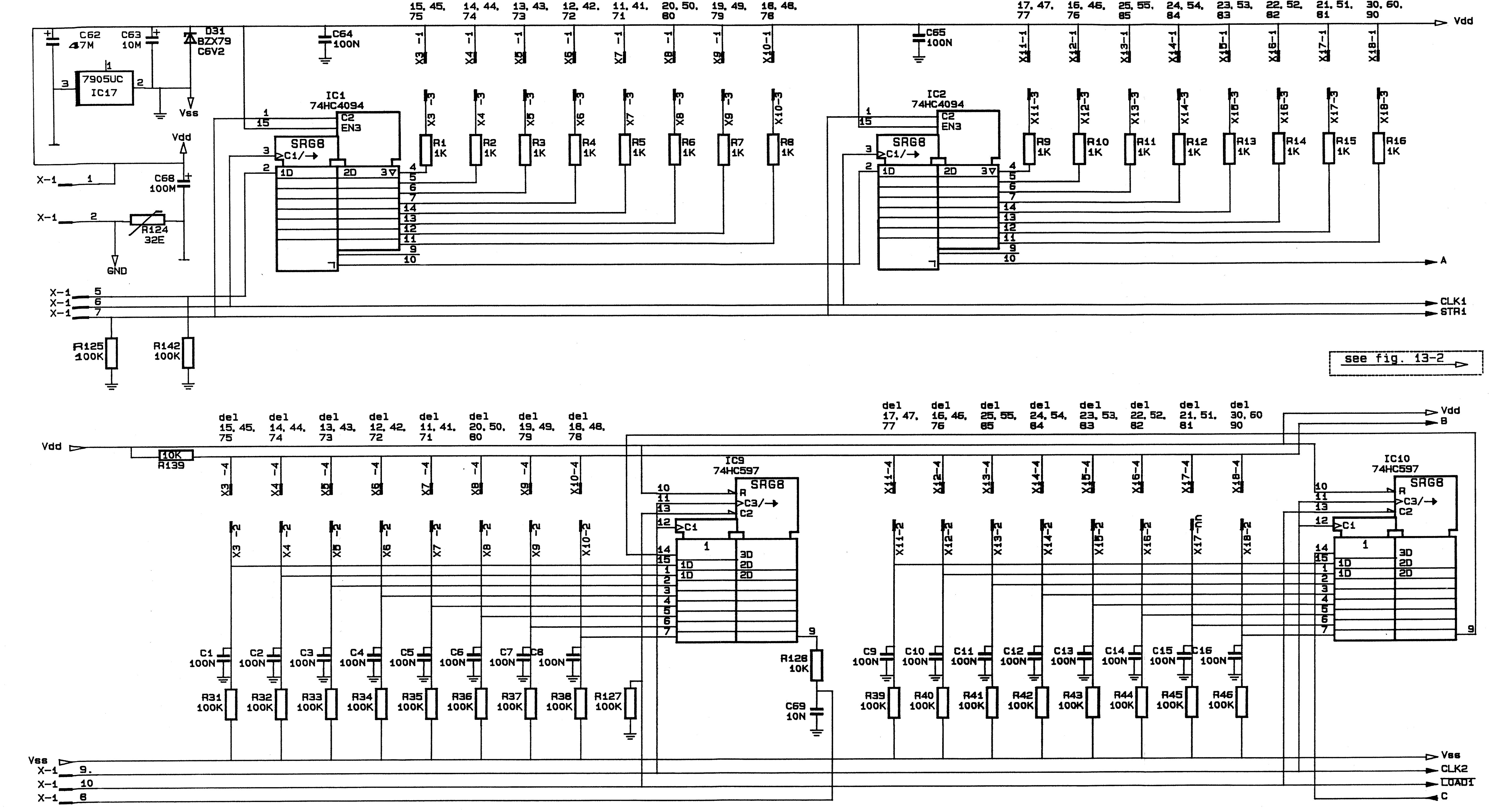


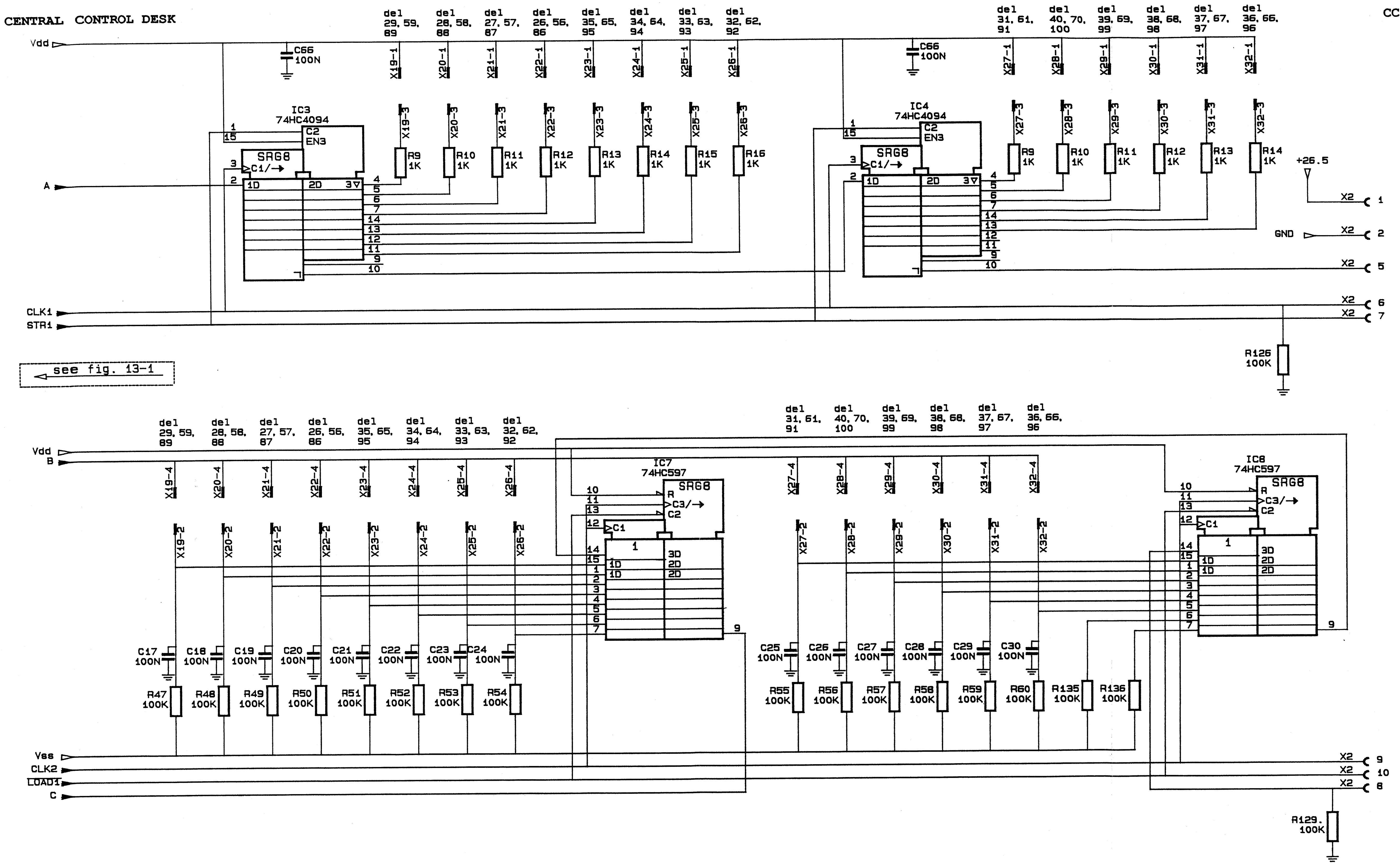
FIG. 12-2 ASSEMBLY DIAGRAM OF LBB 3386/02, BOTTOM SIDE


del 15, 45, 75
del 14, 44, 74
del 13, 43, 73
del 12, 42, 72
del 11, 41, 71
del 20, 50, 80
del 19, 49, 79
del 18, 48, 78
del 17, 47, 77
del 16, 46, 76
del 25, 55, 85
del 24, 54, 84
del 23, 53, 83
del 22, 52, 82
del 21, 51, 81
del 30, 60, 90
Vdd
Vss
GND
C62 47M
C63 10M
D31 BZX79 C6V2
C64 100N
C65 100N
7905UC IC17
C68 100M
R124 32E
IC1 74HC4094
IC2 74HC4094
SRG8
C1/→
C2
EN3
1D
2D
3▽
R1 1K
R2 1K
R3 1K
R4 1K
R5 1K
R6 1K
R7 1K
R8 1K
R9 1K
R10 1K
R11 1K
R12 1K
R13 1K
R14 1K
R15 1K
R16 1K
X-1
X3-1
X4-1
X5-1
X6-1
X7-1
X8-1
X9-1
X10-1
X11-1
X12-1
X13-1
X14-1
X15-1
X16-1
X17-1
X18-1
X3-3
X4-3
X5-3
X6-3
X7-3
X8-3
X9-3
X10-3
X11-3
X12-3
X13-3
X14-3
X15-3
X16-3
X17-3
X18-3
A
CLK1
STR1
R125 100K
R142 100K
see fig. 13-2
B
R139 10K
X3-4
X4-4
X5-4
X6-4
X7-4
X8-4
X9-4
X10-4
X11-4
X12-4
X13-4
X14-4
X15-4
X16-4
X17-4
X18-4
IC9 74HC597
IC10 74HC597
R
C3/→
X3-2
X4-2
X5-2
X6-2
X7-2
X8-2
X9-2
X10-2
X11-2
X12-2
X13-2
X14-2
X15-2
X16-2
X17-2
X18-2
C1 100N
C2 100N
C3 100N
C4 100N
C5 100N
C6 100N
C7 100N
C8 100N
C9 100N
C10 100N
C11 100N
C12 100N
C13 100N
C14 100N
C15 100N
C16 100N
R31 100K
R32 100K
R33 100K
R34 100K
R35 100K
R36 100K
R37 100K
R38 100K
R127 100K
R128 10K
C69 10N
R39 100K
R40 100K
R41 100K
R42 100K
R43 100K
R44 100K
R45 100K
R46 100K
CLK2
LOAD1
C

POWER SUPPLY CONNECTIONS

| | | | |
|---|---|---|---|
| I.C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | Pt.8 | connected to | "(V+) -5V" |
| " | Pt.16 | " | " V+ " |
| I.C 18, 19, 20, 21, 22, 23, 24, 25 | Pt.4 | " | " V+ " |
| " | Pt.11 | " | " ⊥ " |

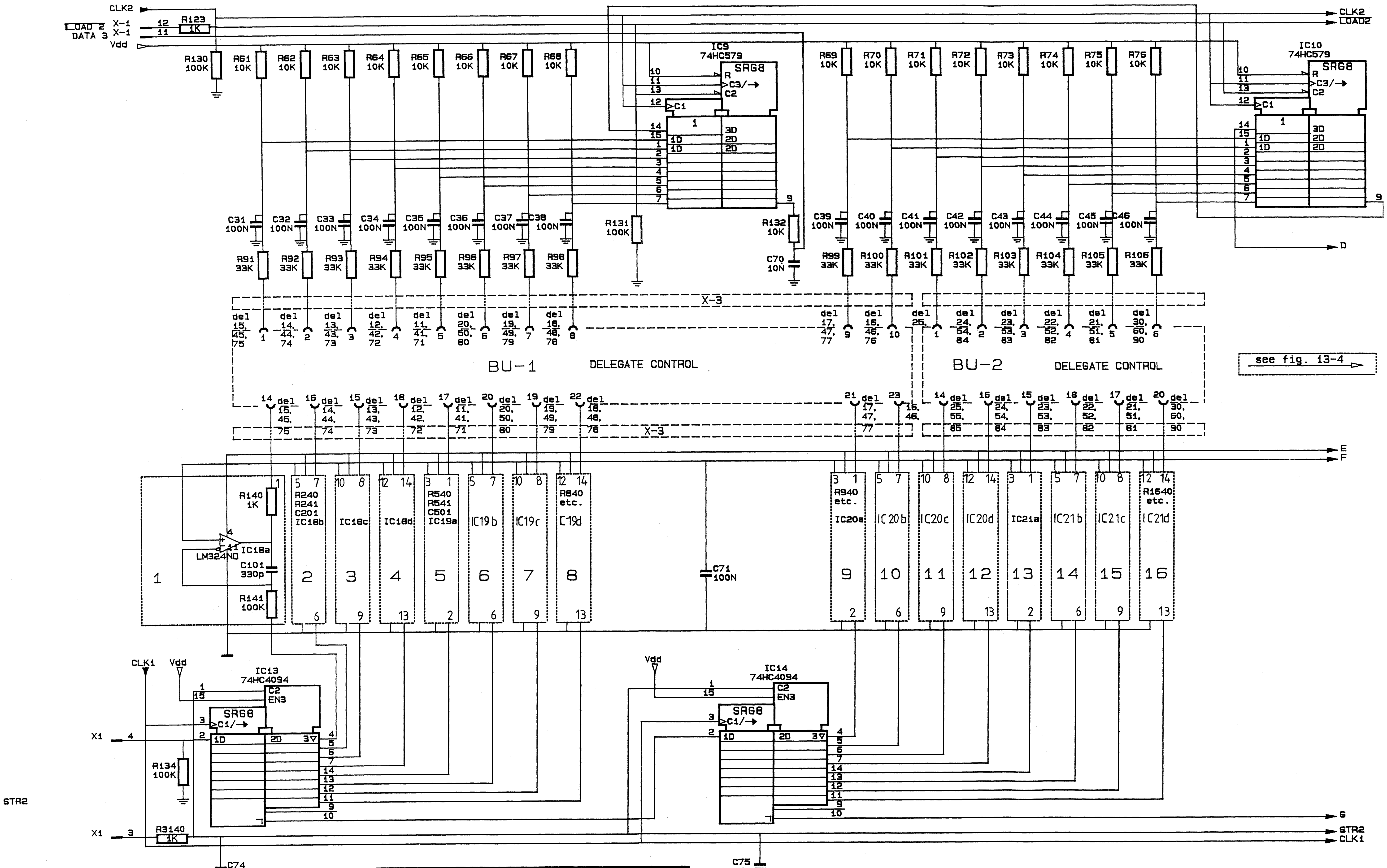
FIG. 13-1 CIRCUIT DIAGRAM OF LBB 3386/02


CENTRAL CONTROL DESK
Vdd
A
CLK1
STR1
C66
100N
IC3
74HC4094
IC4
74HC4094
C2
EN3
SRG8
C1/→
1D
2D
3▽
R9
R10
R11
R12
R13
R14
R15
R16
1K
X19-1
X20-1
X21-1
X22-1
X23-1
X24-1
X25-1
X26-1
X27-1
X28-1
X29-1
X30-1
X31-1
X32-1
X19-3
X20-3
X21-3
X22-3
X23-3
X24-3
X25-3
X26-3
X27-3
X28-3
X29-3
X30-3
X31-3
X32-3
del 29, 59, 89
del 28, 58, 88
del 27, 57, 87
del 26, 56, 86
del 35, 65, 95
del 34, 64, 94
del 33, 63, 93
del 32, 62, 92
del 31, 61, 91
del 40, 70, 100
del 39, 69, 99
del 38, 68, 98
del 37, 67, 97
del 36, 66, 96
+26.5
GND
X2
R126
100K
see fig. 13-1
Vdd
B
IC7
74HC597
IC8
74HC597
R
C3/→
C1
3D
2D
X19-4
X20-4
X21-4
X22-4
X23-4
X24-4
X25-4
X26-4
X27-4
X28-4
X29-4
X30-4
X31-4
X32-4
X19-2
X20-2
X21-2
X22-2
X23-2
X24-2
X25-2
X26-2
X27-2
X28-2
X29-2
X30-2
X31-2
X32-2
C17
C18
C19
C20
C21
C22
C23
C24
C25
C26
C27
C28
C29
C30
100N
R47
R48
R49
R50
R51
R52
R53
R54
R55
R56
R57
R58
R59
R60
R135
R136
100K
Vss
CLK2
LOAD1
C
R129
100K

## POWER SUPPLY CONNECTIONS

| | | | |
|---|---|---|---|
| I.C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | Pt.8 | connected to | "(V+) -5V" |
| " | Pt.16 | " | " V+ " |
| I.C 18, 19, 20, 21, 22, 23, 24, 25 | Pt.4 | " | " V+ " |
| " | Pt.11 | " | " ⊥ " |

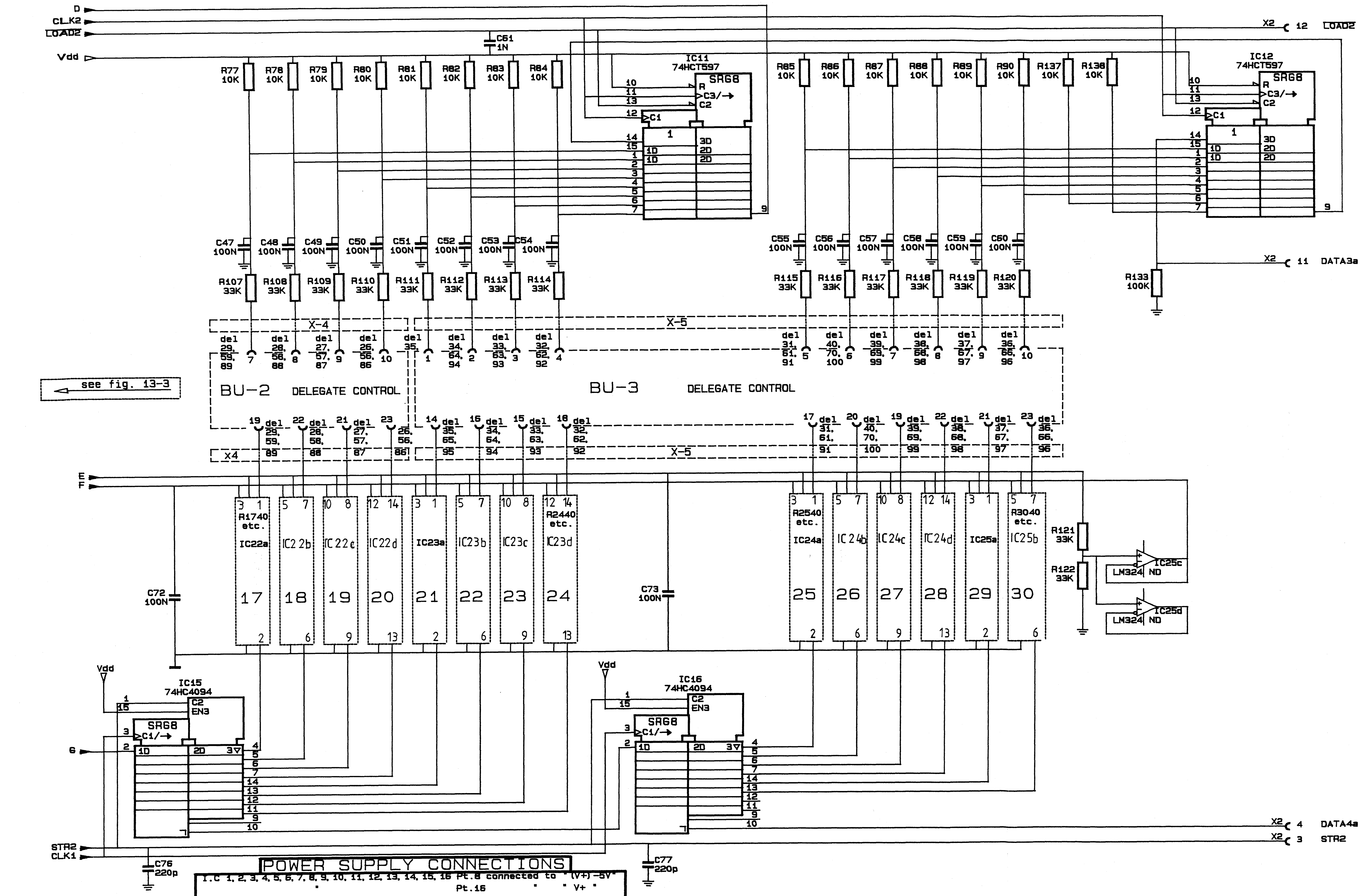
FIG. 13-2 CIRCUIT DIAGRAM OF LBB 3386/02


CLK2
LOAD 2 X-1
DATA 3 X-1
Vdd
R123 1K
R130 100K
R61 10K
R62 10K
R63 10K
R64 10K
R65 10K
R66 10K
R67 10K
R68 10K
IC9 74HC579
SRG8
IC10 74HC579
R69 10K
R70 10K
R71 10K
R72 10K
R73 10K
R74 10K
R75 10K
R76 10K
C31 100N
C32 100N
C33 100N
C34 100N
C35 100N
C36 100N
C37 100N
C38 100N
R131 100K
R132 10K
C70 10N
C39 100N
C40 100N
C41 100N
C42 100N
C43 100N
C44 100N
C45 100N
C46 100N
R91 33K
R92 33K
R93 33K
R94 33K
R95 33K
R96 33K
R97 33K
R98 33K
R99 33K
R100 33K
R101 33K
R102 33K
R103 33K
R104 33K
R105 33K
R106 33K
X-3
BU-1 DELEGATE CONTROL
BU-2 DELEGATE CONTROL
see fig. 13-4
CLK2
LOAD2
D
E
F
R140 1K
IC18a LM324ND
C101 330p
R141 100K
R240 R241 C201 IC18b
IC18c
IC18d
R540 R541 C501 IC19a
IC19b
IC19c
IC19d
R840 etc.
C71 100N
R940 etc. IC20a
IC20b
IC20c
IC20d
IC21a
IC21b
IC21c
R1640 etc. IC21d
CLK1
Vdd
IC13 74HC4094
X1
R134 100K
R3140 1K
STR2
Vdd
IC14 74HC4094
G
STR2
CLK1
C74 220p
C75 220p

## POWER SUPPLY CONNECTIONS

|  |  |  |  |
|---|---|---|---|
| I.C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | Pt.8 | connected to | "(V+) -5V" |
| " | Pt.16 | " " | V+ " |
| I.C 18, 19, 20, 21, 22, 23, 24, 25 | Pt.4 | " " | V+ " |
| " | Pt.11 | " " | ⊥ " |

FIG. 13-3 CIRCUIT DIAGRAM OF LBB 3386/02


D
CLK2
LOAD2
Vdd
C61 1N
R77 10K
R78 10K
R79 10K
R80 10K
R81 10K
R82 10K
R83 10K
R84 10K
IC11 74HCT597
SRG8
R
C3/→
C2
C1
1D
2D
3D
R85 10K
R86 10K
R87 10K
R88 10K
R89 10K
R90 10K
R137 10K
R138 10K
IC12 74HCT597
X2 12 LOAD2
X2 11 DATA3a
R133 100K
C47 100N
C48 100N
C49 100N
C50 100N
C51 100N
C52 100N
C53 100N
C54 100N
C55 100N
C56 100N
C57 100N
C58 100N
C59 100N
C60 100N
R107 33K
R108 33K
R109 33K
R110 33K
R111 33K
R112 33K
R113 33K
R114 33K
R115 33K
R116 33K
R117 33K
R118 33K
R119 33K
R120 33K
X-4
X-5
X4
see fig. 13-3
BU-2 DELEGATE CONTROL
BU-3 DELEGATE CONTROL
E
F
R1740 etc.
R2440 etc.
R2540 etc.
R3040 etc.
IC22a
IC22b
IC22c
IC22d
IC23a
IC23b
IC23c
IC23d
IC24a
IC24b
IC24c
IC24d
IC25a
IC25b
17
18
19
20
21
22
23
24
25
26
27
28
29
30
C72 100N
C73 100N
R121 33K
R122 33K
IC25c LM324 ND
IC25d LM324 ND
Vdd
IC15 74HC4094
IC16 74HC4094
SRG8
C1/→
C2
EN3
1D
2D
3▽
6
STR2
CLK1
C76 220p
C77 220p
X2 4 DATA4a
X2 3 STR2

POWER SUPPLY CONNECTIONS

| | | | |
|---|---|---|---|
| I.C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 | Pt.8 | connected to | "(V+) −5V" |
| " | Pt.16 | " | " V+ " |
| I.C 18, 19, 20, 21, 22, 23, 24, 25 | Pt.4 | " | " V+ " |
| " | Pt.11 | " | " ⊥ " |

FIG. 13-4 CIRCUIT DIAGRAM OF LBB 3386/02

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**Industrial & Electro-acoustic Systems Division**

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|---|---|---|---|
| cat. DOCUMENTATION CHANGES | nr. DC195 | DC195CS044 | date 09-02-1988<br>rev. |
| art. gr. CONGRESS SYSTEMS | nr. CS044 | | sheet 1 of 1 |

Product : CENTRAL SUPPLY UNIT LBB 3300/..

Service manual : 4822 733 24251

Already published :

Reason : COMPATIBILITY WITH CENTRAL CONTROL DESK LBB 3386

Contents : When the central supply unit with a serial number up to 1000 is used in combination with the central control desk, a connection has to be made between point 5 of DIN connector BU104 (DEL 2) and point 30 of connector X102.

Ger van Dongen
Service Prof Audio.

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|---|---|---|---|
| cat. DOCUMENTATION CHANGES | nr. DC195 | DC195CS044 | date 09-02-1988<br>rev. |
| art. gr. CONGRESS SYSTEMS | nr. CS044 | | sheet 1 of 1 |

**Product** : CENTRAL SUPPLY UNIT LBB 3300/..

**Service manual** : 4822 733 24251

**Already published** :

**Reason** : COMPATIBILITY WITH CENTRAL CONTROL DESK LBB 3386

**Contents** : When the central supply unit with a serial number up to 1000 is used in combination with the central control desk, a connection has to be made between point 5 of DIN connector BU104 (DEL 2) and point 30 of connector X102.

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